FLORA OF OMAN

VOLUME 2

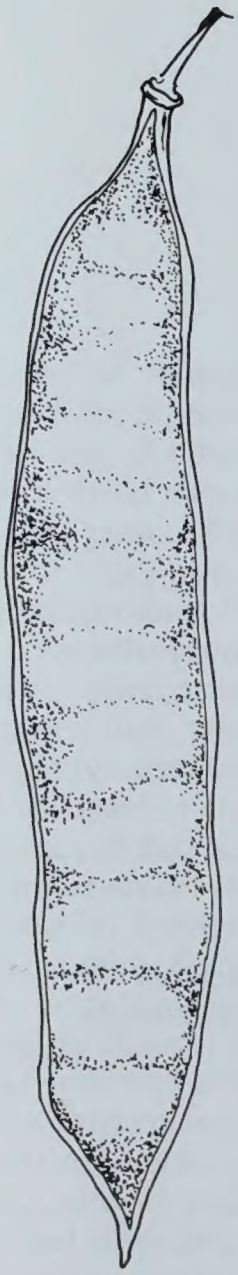
S.A. Ghazanfar

Scripta Botanica Belgica **36**

Cover illustration:
Delonix elata (Caesalpiniaceae); photo S.A. Ghazanfar

Illustration page i:
Fruit of Delonix elata (Caesalpiniaceae)
Drawn by S.A. Ghazanfar

11 JAN. 2008
READING ROOM



Shahina A. Ghazanfar
(families 53, 55, 56, 63, 66 & 67
by Annette Patzelt)

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of the
Sultanate of Oman

Volume 2
Crassulaceae - Apiaceae

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Cover illustration: *Delonix elata* (Caesalpiniaceae); photo S.A. Ghazanfar
Illustration page i: fruit of *Delonix elata* (Caesalpiniaceae); drawn by S.A. Ghazanfar
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Foreword

This second volume of the Flora of Oman continues the first comprehensive account of the plants of the Sultanate. In the foreword to the first volume, Hew Prendergast outlined the roles of this and all other Floras – delivering basic information on plants, telling how they can be identified and named, and where they grow.

In the present Flora, the answer to this last question is given by providing a grid map with dots for every place from where a species is recorded. This feature makes the Flora of Oman a unique product. It delivers at the same time the results of two phases in the growth of botanical comprehension, viz. the classical identification instrument which every Flora is, and a survey – often named 'Atlas' – of the known distribution of the species in a country. In most countries, these two goals in the knowledge of plants were attained with a great elapse of time. Many other countries have not yet reached the geographical consolidation phase of their flora, and have set up ambitious long-term floristic projects carried out by teams of botanists and amateurs of the indigenous flora.

Almost on her own, Shahina Ghazanfar presents here a Flora and an 'Atlas' for Oman in one publication. Inevitably and as in all parts of the globe, the flora dealt with will undergo changes in the coming decades. As elsewhere, a number of the species will decrease or become extinct, other ones may be expected to take profit of the growing man-made environment or the changing climate, and invaders will come. But the present Flora has put the Sultanate on the list of countries able to follow and monitor the alterations of its natural heritage. The conservation importance of this work is further enhanced by references to the national Red List, ex situ collections and other conservation issues.

In countries such as Oman knowledge of vernacular names and local uses too is fragmentary and dispersed. A step towards consolidation is here made too. The flora assembles all vernacular names recorded, relates them to internationally used scientific names, and brings together knowledges on uses. This latter information varies from edibility of wild fruits and uses in traditional medicine to information on the probably most important wild plant of Oman – *Boswellia sacra*, the source of true frankincense, a species at the issue in this second volume. For this volume, an alphabetical index of all vernacular names with their scientific counterpart has been prepared. It is available on the included CDrom only and will be printed in the last volume of the Flora.

Elmar Robbrecht
National Botanic Garden (Belgium)

Volume 1 of the Flora was published in 2003. The author has deposited the manuscript for volume 2 in 2005. Circumstances unexpected for the publisher have caused the delay of its publication until now. Volume 3 is scheduled for 2008.

To facilitate consultation of the photographs, the colour illustrations on the CD-ROM (referred to as 'illustration' in the text) have received, from this volume onwards, the same number as the distribution maps.

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Many colleagues and friends have given me their time, advice and help during my research and the final production of this volume; I thank them all. Henk Beentje and Martin Fisher very kindly read the final draft of this volume.

Thanks again to Elmar Robbrecht, and to the National Botanic Garden of Belgium, for their support and the publication of the Flora.

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Preface

The second volume of the Flora of the Sultanate of Oman includes 32 families of flowering plants (30 native, 2 cultivated), and describes 277 taxa in 112 genera, following Cronquist's (1981) system of classification. This volume includes the Subclass Rosidae Takhtajan (1966) with most of the species found in Oman in the five large orders, Fabales, Myrtales, Euphorbiales, Rosales and Sapindales. For each species the format follows as for the first volume except for the illustration number which is now the same as the number of the distribution map. This is adopted for this and for subsequent volumes so that photos and/or illustrations of species can be added later without altering their reference in text or on the CD-ROM.

The accompanying CD-ROM contains photographs of most of the species included in this Volume and Volume 1. I have also added a list of vernacular names for both volumes to further aid the identification of species through photographs when only a vernacular name may be known.

As for Volume I, in the distribution maps a dot represents the presence of a species in 25×25 km on a 100×100 km UTM grid on the map.

Accounts of the families Balsaminaceae, Geraniaceae, Oxalidaceae, Rhamnaceae, Rutaceae, Salvadoraceae and Vitaceae have been authored by Annette Patzelt, currently Assistant Professor at the Department of Biology at Sultan Qaboos University, Oman. She is also curator of the herbraium, and director of the University botanic garden.

Shahina A. Ghazanfar
Royal Botanic Gardens, Kew

Abbreviations and Transliteration

Standard botanical abbreviations of Latin words used in text are listed below.

aff.	affinis: akin to
auct.	auctorum: of authors
c.	circa: about
in sched.	in schedula: on herbarium label or sheet
loc. cit.	loco citato: on the page previously cited
nom.	nomen: name
nom. conserv.	nomen conservandum: conserved name
nom. illegit.	nomen illegitimum: illegitimate name
nom. nud.	nomen nudum: name unaccompanied by a description
n.v.	non vidi: not seen
op. cit.	opere citato: in the work previously cited
p.p.	pro parte: in part
s.n.	sine numero: without number
s.l.	sensu lato: in a broad sense
s.str.	sensu stricto: in the strict sense

Arabic, Harsūsī and Jibbālī names are transliterated using the BGN/PCGN 1956 System (US Board on Geographical Names and the Permanent Committee on Geographical Names for British Official Use).

	Arabic	Romanization		Arabic	Romanization
Alif	ا	a	Dād	ض	ḍ
Ba	ب	b	Ṭa	ط	ṭ
Ta	ت	t	Za	ظ	ẓ
Tha	ث	th	ʻAyn	ع	ʻ
Jīm	ج	j	Ghayn	غ	gh
Ha	ح	ḥ	Fa	ف	f
Kha	خ	ḵh	Qaf	ق	q
Da	د	d	Kaf	ك	k
Dha	ذ	dh	Lam	ل	l
Rā	ر	r	Mīm	م	m
Zā	ز	z	Nūn	ن	n
Sīn	س	s	Ha	هـ	h
Shīn	ش	sh	Waw	و	w
Sad	ص	ṣ	Ya	ي	y

39. Crassulaceae

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Key to the genera of Crassulaceae in Oman

1. Leaves rotund, peltate, with long petioles . . . . . .4. **Umbilicus**
1. Leaves various in shape, sessile or with short petioles, never peltate or rotund
   2. Petals free or united only at base
      3. Leaves opposite, united at the base to form a sheath; flowers 3–5-merous . . . . . .1. **Crassula**
      3. Leaves alternate, not united at the base; flowers 4–5(–9)-merous (5-merous in Oman species) . . . . . .2. **Sedum**
   2. Petals united into a tube with spreading lobes; flowers 4–merous . . . .3. **Kalanchoe**

1. **Crassula** L.

About 16 species with a worldwide distribution, but especially South Africa.

Crassula alata (Viv.) A.Berger in Engl. & Prantl., Naturl. Pflanzenfam. ed. 2, 18a: 389 (1930), auct. Miller op. cit. (1996).
Basionym: *Tillaea alata* Viv. (1830).

Description: Small annual herb, short-lived. Stems simple or branched, 2–8 cm, glabrous, somewhat fleshy. Leaves opposite, sessile, 3–3 × 1–2 mm, lanceolate, entire, acute to acuminate, united at the base to form a sheath around the node, glabrous. Flowers 3–5-merous, in axillary clusters, 2 arising in each leaf axil; pedicel 0.5–3 mm. Sepals ± 1 mm, lanceolate, aristate, lobes united at the base. Petals free, ± 2 mm, oblong-lanceolate, white or greenish. Stamens the same number as petals; filaments adnate to the corolla at the base. A small nectar scale present at the base of the filaments. Carpels 3–5, free. Fruit (follicle) 0.5–0.6 mm, 2-seeded.

Flowering and fruiting: February to April.

Distribution and habitat: Northern Oman, Musandam, in gravelly soil, amongst stones and rocks, and in compacted sand. *Altitude*: 200–700 m. Distributed from N Africa east to Iran, Pakistan and NW India. Elsewhere in the Arabian Peninsula found in Kuwait, Saudi Arabia, UAE. Also found on Soqotra.

Distribution map: 291.

Notes: Not common and probably undercollected. So far recorded only from Musandam.

2. **Sedum** L.

300 or more species distributed in the north temperate regions, south to C and E Africa, W Asia, Himalayas and the Philippines; also Guatemala and El Salvador.

Sedum hispanicum L., Cent. pl. I: 13 (1755) & Amoen. acad. 4: 273 (1759) & Sp. Pl. ed. 2: 618 (1762).

Description: Annual herb. Stems erect to ascending, usually branched from base, up to 15 cm, sparsely glandular-hairy. Leaves alternate, sessile, succulent, 5–15 × 1–4 mm, terete or flattened, oblong to linear or oblong-lanceolate, entire, acute, glabrous, glaucous. Flowers 5-merous, in simple or forked cymes. Sepals free, 1–2 mm, ovate to triangular, apiculate, ± glabrous. Petals free, white with a reddish median line, 4–5 mm, lanceolate. Stamens 10 or more, in 2 whorls. Nectar scale spathulate. Carpels 4–5, connate at base; style short; stigma capitate. Follicles 3–6 mm, spreading stellately.

Flowering and fruiting: February to April.

Distribution and habitat: Northern Oman, Musandam, on rocky slopes, sand flats and wadi banks. *Altitude*: 500–1500 m. Distributed in S & C Europe, Caucasus, Turkey, Lebanon, Palestine, Iraq, N Iran. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map: 292.

3. **Kalanchoe** Adans.

About 60 species distributed mainly in Africa and Madagascar, extending to tropical Arabia and Asia; single species in tropical America.

Kalanchoe glaucescens Britten in Oliv., Fl. Trop. Afr. 2: 393 (1871), non Blatter (1919–1936). *Synonyms*: *K. glaucescens* var. *glabra* Cuf. from Yemen is referred to as *K. deficiens* (Forssk.) Asch. & Schweinf. var. *glabra* Raadts in Willdenowia 18: 423 (1989).

Description: Perennial herb, forming clumps, glaucous. Stems fleshy, erect, ± branched, up to 60 cm, glabrous. Leaves opposite, fleshy, shortly petiolate or sessile, 5–10 × 3–7 cm, broadly ovate to obovate, rounded at the apex, with obscurely crenate margins, glabrous. Flowers 4-merous, in terminal corymb-like cyme; flowering stalk up to 30 cm; sepals connate below, lobes ± 5 mm, ovate, acute, glabrous; petals orange-red to dark red-peach, tubular, 4-lobed above, oblong, mucronate, the lobes spreading. Follicles 4, many-seeded (not seen).

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, on rocky slopes, under *Euphorbia* and *Acacia* shrubs in *Acacia-Commiphora* shrubland. Altitude: 400–850 m. Distributed in NE and E tropical Africa. Elsewhere in the Arabian Peninsula found in Saudi Arabia, ?Yemen.

Distribution map & Illustration: 293.

Notes: The species is very localized in its distribution in Oman, occurring on the coastal escarpment in the shrubland and woodland of Jebel Qamar. The colour of the flowers of Oman material differs from the plant identified as *K. glaucescens* in Collenette 1999: p. 242, however Miller & Cope (1988) record that the flower colour can be orange-yellow, orange or pinkish. Our material could be *K. deficiens* var. *glabra* but more material is needed for confirmation.

The species is an attractive plant and easily cultivated. With new roads giving access to the area where this species grows, it could be at threat from amateur collectors and commercial horticulturists, therefore its conservation status at the national level is established as Vulnerable. With more records of its distribution this category may be revised.

4. **Umbilicus** DC.

About 12 species distributed from the mediterranean region in W Europe, west to Macaranesia, east to Iran and south to Cameroon and Tanzania.

Umbilicus horizontalis (Guss.) DC., Prodr. 3: 400 (1828).
Synomyms: *Cotyledon umbilicus* auct. non L. (1753).

Description: Perennial herb with a tuberous root. Stems erect, fleshy, up to 25 cm, glabrous. Leaves fleshy, rotund, 3–9 cm in diameter, peltate, margin obscurely to irregularly crenate or sometimes entire; basal leaves with long petioles (up to 10 cm). Flowers 5-merous, pendulous, in terminal racemes. Sepals ± 2 mm. Corolla 5–7 mm, tubular, lobed above, lobes ovate, pale green, sometimes tinged red. Stamens 10. Carpels 5. Follicles many-seeded.

Flowering and fruiting: January to March/April.

Distribution and habitat: Northern Oman, Musandam, amongst rocks, on damp shaded soil, rocky overhangs and in crevices. *Altitude*: 1000–1800 m. Distributed in the Mediterranean region and SW Asia. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen, UAE. Also found on Soqotra.

Distribution map & Illustration: 294.

Notes: Not common, and so far only collected from Musandam. It is one of the first plants to come up in January, readily recognized by its rotund, peltate leaves. Easily overlooked as it occurs under rocks in shady and moist locations.

40. Rosaceae

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Key to the genera of Rosaceae in Oman

Leaves broadly ovate, deciduous; flowers white; fruit globose, smooth .1. **Cotoneaster**
Leaves linear-lanceolate, falling soon (stems almost always leafless); flowers pink; fruit ovoid, pubescent .....2. **Prunus**

1. **Cotoneaster** Medik.

About 50 species distributed from Europe to China and the Himalayas.

Cotoneaster nummularia Fisch. & C.A.Mey., Ind. Sem. Hort. Petrop. 2: 34 (1893).

Description: Small shrub up to 2 m, branched; branches unarmed, arching and spreading. Leaves often present on short lateral shoots, petiolate; petiole 1–2 mm; leaves 0.5–2(–4) × 0.5–1(–3) cm, broadly ovate to rotund, apex obtuse with an apiculate tip or emarginate, base tapering into a short petiole, margin entire, sparsely pilose above, grey-tomentose to pilose on the under-surface. Flowers 3–7, in compact cymes. Pedicel, receptacle and sepals white-tomentose. Sepals 1–2 mm, persistent. Petals white, 2–3 mm. Stamens ± 20. Fruit 6–8 mm, subglobose, red becoming purple-black when mature, crowned by the persistent calyx.

Flowering and fruiting: May to June.

Distribution and habitat: Northern Oman, in the western Hajar mountains, on rocky mountain slopes and gullies, with *Juniperus* and *Olea*. *Altitude*: 2300–2700 m. Distributed in Crete, Cyprus, Turkey, Lebanon, Syria, N Iraq, Caucasia, W Iran and Ethiopia. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map & Illustration: 295.

Notes: Not common in Oman and restricted to a few locations on the Jebel al Akhdar.

2. **Prunus** L.

About 400 species temperate in distribution especially in the north temperate regions. Many species and their cultivars are important fruit trees.

Prunus arabica (Oliv.) Meikle, Kew Bull. 19: 229 (1965).
Synonyms: *Amygdalus arabica* Oliv. (1804).
Vernacular names: meez, miz, mizi (Musandam), samamayz (Eastern Hajar).

Description: Unarmed large shrub or small tree, up to 2.5 m. Twigs green, ribbed. Leaves falling soon, 10–30 × 1–3 mm, linear-lanceolate to linear-spathulate, margin entire to irregularly crenate, glabrous or sparsely pubescent. Flowers solitary, sessile, appearing before the leaves. Sepals 3–4 mm, ovate, deciduous. Petals pink to pale pink, 5–10 mm, obovate. Drupe 1.5–2.5 cm, ovoid, apiculate, grey-green to brown-green, pubescent; stone smooth.

Flowering and fruiting: January to March.

Distribution and habitat: Northern Oman, in the mountains of Musandam and a part of the eastern Hajar on Jabal Bani Jabir, on dry rocky plateaus, wadi sides and in gullies, with *Acacia* and *Zizyphus*. *Altitude*: 500–1800 m. Distributed in Syria, Lebanon, Jordan, N Iraq, N Iran, Turkey. Elsewhere in the Arabian Peninsula found in Saudi Arabia, UAE.

Distribution map & Illustration: 296.

Notes: In Musandam the tree is sometimes planted as a windbreak at the edges of small farms on the mountains. The wood is used to make the handle of the traditional tribal axe (Arabic: juzr, yizr) popular in Musandam. The seed kernel is usually very bitter and inedible (recorded to be edible by Jongbloed, p. 482 (2003).

Cultivated species

Prunus ×domestica L. (1753).
Vernacular names: mish mish.

Deciduous tree up to 5 m. Fruit oblong, yellow, sweet. The plum is cultivated on the Saiq plateau in the Jebel al Akhdar range and sold locally, and in the markets in Nizwa. *Illustration*: 296g, h.

The peach, *P. persica* and the almond, *P. dulcis* are rarely cultivated in Oman.

Rosa ×damascena Mill. (1768).
Vernacular names: ward; ward al Shrazī

Prickly shrub up to 1.5 m with pink, 5-petaled very fragrant flowers. Hypanthium fleshy and red when ripe. Cultivated on the Saiq plateau in the Jebel al Akhdar range in several villages (usually from 1800–2000 m) for making rose water. The distillation of rose water is done in a traditional way using mud chimneys and wood fire which gives a very smoky smell to the distillate. Rose water distillation takes place in April when the roses bloom. The rose water from the Saiq plateau is famous for its fragrance throughout Oman; it is sold in markets in Nizwa and Seeb and is used to give the smoky flavour to black

'halwa', a common traditional sweet in Oman. *Illustration*: 296i, j.

41. Neuradaceae

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Neurada L.
A single species distributed from N Africa east to Arabia and India; also Cyprus.

Neurada procumbens L., Sp. Pl. 441 (1753).
Vernacular names: sādan; abithīt (Harsūsī).

Description: Annual herb. Stems and branches prostrate, 6–15 cm, densely grey-green tomentose. Leaves alternate, pinnately lobed, 5–20 × 3–12 mm, margins sinuate. Flowers yellow or pink, in the axils of leaves. Receptacle discoid, echinate above, enlarging and becoming woody in fruit. Sepals 2.5–3 mm, triangular-ovate. Petals ± 1 mm, obovate. Stamens 10. Fruit 10–20 mm in diameter, flattened, orbicular, dry and woody, spiny above, smooth below, indehiscent, retained as a collar around the base of the new plant.

Flowering and fruiting: February to April, after rain.

Distribution and habitat: Throughout Oman, in sandy and stony places, silty wadi fans and wadi beds. *Altitude*: 20–650 m. Distributed in N Africa, Cyprus, desert regions of NE Africa, SW Asia, NW India. Elsewhere in the Arabian Peninsula found in Bahrain, Kuwait, Qatar, Saudi Arabia, Yemen, UAE.

Distribution map & Illustration: 297.

Notes: Despite the spiny fruits that are dispersed by sticking to legs of animals, the species is surprisingly uncommon, possibly due to the large number of goats that graze most of the seedlings as soon as they emerge.

42. Mimosaceae (Leguminosae: Mimosoideae)

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The three related families Caesalpiniaceae, Mimosaceae and Fabaceae are often recognized as subfamilies of the large family Leguminosae. Each family (or subfamily) shows distinct floral characters and is separated easily by the following key:

1. Flowers regular; petals valvate in bud; stamens as many as or twice as many as the petals,or numerous; leaves almost always bipinnate . . . . . .42. Mimosaceae (Leguminosae: Subfamily Mimosoideae)
1. Flowers irregular; petals imbricate in bud; stamens usually 10 or fewer; leaves digitate or pinnate, rarely bipinnate
   2. Lateral petals (when present) overlapping the upper (adaxial) petal; petals ± similar or absent; sepals often free; stamens usually free . . . . . .43. Caesalpiniaceae (Leguminosae: Subfamily Caesalpinioideae)
   2. Lateral petals not overlapping the upper (adaxial) petal; petals often differentiated into an upper standard petal, 2 lateral wings and 2 lower keel petals; sepals united at base; stamens usually variously united . . . . . .44. Fabaceae (Leguminosae: Subfamily Papilionoideae)

Key to the genera of Mimosaceae in Oman

1. Spines terminating short branches, often bearing leaves, otherwise stems unarmed; inflorescences two-coloured, upper part with yellow fertile flowers, lower part with pink to white neuter flowers; pods clustered . . . . . .2. **Dichrostachys**
1. Stems armed with thorns, prickles or spines; inflorescence one-coloured with all flowers fertile; pods single or several arising from one point, but not clustered
   2. Large tree with branches appearing drooping; stipular spines absent; pods cylindrical, sometimes irregularly constricted in between the seeds, never flattened . Often the only tree in sandy desert areas (in the Arabian Peninsula) . . . . . .1. **Prosopis**
   2. Often small trees or shrubs (if a large tree, never appearing with drooping branches and never in sand deserts); stipular spines often present; pods usually flattened . . . . . .3. **Acacia**

1. **Prosopis** L.

About 37 species, western Asia to India, N and tropical Africa, southern USA to Chile and Argentina.

Prosopis cineraria (L.) Druce, Rep. Bot. Soc. Exch. Cl. Brit. Isles 1913, 3: 422 (1914).
Basionym: *Mimosa cineraria* L. (1753).
Vernacular names: ghāf; ʿawd (also in Harsūsī).

Description: Tree, up to 10 m tall or sometimes with branches straggling and becoming a large shrub; bark fissured. Young branches with irregularly placed curved prickles. Leaves bipinnate, drooping on the branches, leaflets 7–12 pairs, 1–2 mm long, oblong. Flowers yellow, grouped in axillary spikes; spikes up to 5 cm long. Flowers ± 6 mm. Calyx 5-lobed. Stamens 10, exserted. Fruit a pod, 8–15 × 7–10 mm, cylindric or slightly curved, slightly woody, 5–15-seeded, internally septate between the seeds, sometimes constricted slightly and irregularly in between the seeds, pendulous, yellow-green when young, reddish-brown when mature, not splitting at maturity.

Distribution and habitat: Throughout Oman in sandy and gravel plains. This is the dominant tree in the sandy dune deserts of Wahibah, Muqshin and at the edges of the sandy desert on the eastern border of Rub al Khali. *Altitude*: 0–150 m. Also distributed in Iran, Afghanistan and the desert areas of Pakistan and India. Elsewhere in the Arabian Peninsula found in Kuwait, Qatar, Saudi Arabia, UAE.

Flowering and fruiting: March to May; September to October.

Distribution map & Illustration: 298.

Notes: One of the most common trees of the sandy desert areas and of great use especially for the bedouins in providing shade and browse for their livestock. Degraded *Prosopis* woodlands are present on the outskirts of Wahibah Sands and Rub al Khali. Other areas in the central desert also have remnants of *Prosopis* woodlands. Extensively browsed by camels, and pods used as fodder. Leaves, bark and pods have been used in traditional medicine to treat cataracts, dyspepsia, earache, toothache, and to give relief from pain in bone fractures.

P. koelziana is found in the deserts of Saudi Arabia, distinguished by its obliquely placed seeds, but I have not recorded this species from Oman.

Cultivated species

Prosopis juliflora (Swartz) DC. (1825).

Tree to 3 m with spreading branches, dark green to bluish green foliage; spikes of yellow flowers and straw-coloured pods. This tree species was (and still is) used extensively as a landscape tree in Oman for most development projects of roads and public parks. Over a period of time it has become weedy throughout the country due to its hardy nature and its tolerance to high temperatures and salinity. It has spread and is now becoming naturalised in wadis and the coastal plains. In Dhofar it is also reported to have proliferated to the mountains; on the Batinah it forms impenetrable growth at several locations on the coast. *P. julifera* is a serious weed of arid lands that eventually destroys the natural vegetation where it invades. In 2003 I found this species widespread in both northern and southern Oman. Attempts were being made to control it, especially in Dhofar, but that was proving to be difficult.

2. **Dichrostachys** (DC.) Wight & Arn.

About 20 species distributed in the Old World tropics, from Africa to Australia, abundant in Madagascar, India, Sri Lanka, Indo-China through Malesia to Australia.

Dichrostachys cinerea (L.) Wight & Arn., Prodr. Fl. Ind. Or. 271 (1834).
Basionym: *Mimosa cinerea* L. (1753).

Description: Shrub or a small tree, up to 2 m; bark rough. Branches and stems unarmed but short lateral branches ending in spines, often bearing leaves or flowers. Leaves bipinnate, up to 10 cm long, with 8–15 pairs of pinnae; each pinna with more 4 than 20 pairs of leaflets; each leaflet ± 3 mm long, oblong. Flowers in axillary spikes, 3.5–4 cm, pendant, the fertile upper part ± 2 cm with yellow flowers, the lower neuter with pink-purple flowers. Calyx ± 1 mm, 5-lobed. Corolla 2–3 mm, united below. Stamens 10, all fertile in bisexual flowers; staminodes (of neuter flowers) exserted. Pods twisted and clustered, 3–4 cm, brown, 2–4-seeded.

Distribution map: 299.

Distribution and habitat: Southern Oman, Dhofar where it has been collected from the western part of the Dhofar mountains on Jebel Qamar. It is not common in the location where it was first recorded. *Altitude*: ± 750 m. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

3. **Acacia** Mill.

1200 species distributed throughout tropical and subtropical regions of the world, especially drier areas and warm Australia.

1. Prickles arranged in 3's just below the nodes, the central curving downwards and the laterals curving upwards. (Flowers in spikes; pod flat, dehiscent) .....1. **A. senegal**
1. Prickles not arranged as above
   2. Prickles present on the apex of each pinna; pods distinctly straw-coloured. (Flowers in spikes) .....2. **A. hamulosa**
   2. Prickles absent from pinnae; pods mostly brown
      3. Flowers in spikes
         4. Prickles paired, curved. (Leaflets 2–3 pairs on the pinnae) .....4. **A. laeta**
         4. Prickles single .....3. **A. asak**
      3. Flowers in globose heads
         5. Leaves with 2 pinnae. (Flowers yellow; pods straight, falttened) ....6. **A. ehrenbergiana**
         5. Leaves with more than 2 pinnae
            6. Pods twisted. (Flowers white) .....9. **A. tortilis**
            6. Pods straight or slightly curved, never twisted
               7. Flowers bright yellow; pods markedly constricted in between the seeds .. ..7. **A. nilotica**
               7. Flowers white or cream; pods not as above
                  8. Pods 5–19 cm long, brown-red, dehiscent at maturity, soft-pubescent .....10. **A. gerrardii**
                  8. Pods 4–6 cm long
                     9. Pods straight, purplish brown at maturity, glabrous, with longitudinal lines .....8. **A. etbaica.**
                     9. Pods smooth, grey-green at maturity, slightly constricted in .... between the seeds, pubescent .....5. **A. oerfota**

1. ***Acacia senegal*** (L.) Willd., Sp. Pl. 4: 1077 (1806).
Basionym: *Mimosa senegal* L. (1753).
Vernacular names: tulḥ (also (Jibbālī); dhemmār (Ẓufari Arabic); dhur, thor (Jibbālī).

Description: Tree or a large shrub, up to 4 m, crown rounded; bark dark greyish brown, peeling in older stems. Prickles (just below the nodes) arranged in 3's, the central curving downwards and the laterals curving upwards. Leaves with 5–8 pairs of pinnae; leaflets 7–25 pairs, 3.5–4 × 2 mm, oblong, pale green. Inflorescence spicate, up to 9 cm, pedunculate; flowers white to cream. Calyx 2–3 mm, 5-lobed. Corolla 5-lobed. Stamens many, exserted. Pod (3.5–)6.5–9 × 1.8–2 cm, flattened with thickened edges, 2–5-seeded, green when young, brown-red when mature with distinct lateral veins, slightly constricted in between the seeds.

Flowering and fruiting: September, October.

Distribution and habitat: Southern Oman, Dhofar, on the escarpment mountains in *Anogeissus-Delonix-Blepharispermum-Commiphora* woodland, and in woodland dominated by *Acacia nilotica* on lower slopes, and along wadi banks on mountains; also at the edge of the *Euphorbia balsamifera* zone in the slightly drier summit areas. *Altitude*: 60–800 m. Distributed in from W Africa to Somalia, southwards to South Africa and SW Asia to India. Elsewhere in the Arabian Peninsula found in Saudi Arabia.

Distribution map & Illustration: 300.

Notes: The tree yields the true gum arabic used in medicines, confectioneries and varnishes. The resin is also used as a strong adhesive. Bark and resin are believed to be antiseptic and have been used in traditional medicine as a plaster for setting bones and as a general tonic. The

foliage is browsed by cattle. Several varieties are recognised; the Oman plants are referable to var. *senegal*.

2. ***Acacia hamulosa*** Benth., Lond. J. Bot. 1: 509 (1842).

Description: Tree or a large shrub, 2–3 m, very spiny, crown rounded; bark fissured, brown with whitish longitudinal fissures. Prickles (just below the nodes) 2 or 3, curving downwards or straight, dark tipped and reaching to 5 mm. Leaves with 3 pairs of pinnae, placed distantly; leaflets 6–8 pairs, 3–5 × 2 mm, oblong, grey-green; apex of rachis with hooked prickle. Inflorescence spicate, 3–4 cm, pedunculate; flowers white. Calyx 1–2 mm, 5-lobed. Corolla 5-lobed. Pod 4–6 × ± 2.5 cm, compressed, 2–3-seeded, yellow-green tinged purple when young, yellow-brown when mature, dehiscent.

Flowering and fruiting: September, October.

Distribution and habitat: Southern Oman, Dhofar, in the drier areas, and dry limestone wadis and hills north of the escarpment. *Altitude*: 500–800 m. Distributed in Somalia, Ethiopia and Kenya. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map: 301.

3. ***Acacia asak*** (Forssk.) Willd., Sp. Pl. 4: 1077 (1806).
Basionym: *Mimosa asak* Forssk. (1775).
Vernacular names: asak.

Description: Tree or large shrub, often multi-stemmed, up to 3 m, crown rounded; bark dark reddish-brown. Prickles (just below the nodes) 2 or 3, up to 7 mm, dark brown and glossy, all curving downwards or straight. Leaves with 5–7 pairs of pinnae; leaflets 7–9 pairs on each pinna, 2–4 × 2 mm, oblong. Inflorescence spicate, up to 6 cm, pedunculate, in clusters; flowers white, faintly fragrant. Calyx ± 1 mm, 5-lobed. Corolla 5-lobed, stamens many, exserted. Pod 7–9 × 13–11 cm, flattened, 5–6-seeded, brown-green, dehiscent.

Flowering and fruiting: September.

Distribution and habitat: Southern Oman, Dhofar, on the escarpment hills, on steep rocky hill slopes. *Altitude*: 500–850 m. Distributed in NE Africa (Sudan, Somalia Ethiopia). Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map: 302.

Notes: Apparently not very common or perhaps undercollected. The name of this species is based on a specimen collected from Yemen by Forsskål, March 1763 (K photo).

4. ***Acacia laeta*** R.Br. & Benth., Lond. J. Bot. 1: 508 (1842).
Vernacular names: temrit (Jibbālī).

Description: Small tree or large shrub, up to 2 m, crown rounded; bark grey, fissured. Prickles paired, up to 5 mm, curved downwards, dark reddish-brown. Leaves in fascicles of 1–2, each with 3 pairs of pinnae; leaflets 2–3 pairs, 4–5 mm, oblong to obovate. Inflorescence spicate, 3–4 cm, pedunculate; flowers pale yellow. Calyx ± 1.5 mm, 5-lobed. Corolla 1.5–2 mm, reddish; stamens many, exserted. Pod 2.5–5 × 0.9–1.4 cm, flattened, 2-seeded, straw-coloured to pale-brown, dehiscent. Seeds ± 5 mm, ovoid, brown.

Flowering and fruiting: September.

Distribution and habitat: Southern Oman, in Dhofar, in the lower dry hills of the escarpment mountains and on the north-facing lower slopes, in the *Acacia–Commiphora* scrub. *Altitude*: 300–550 m. Distributed from Kenya northwards to Israel and Palestine. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map: 303.

5. ***Acacia oerfota*** (Forssk.) Schweinf., Bull. Herb. Boiss. 4, app. 2: 213 (1896).
Basionym: *Mimosa oerfota* Forssk. (1775); *Acacia nubica* Benth. (1842); *Acacia aucheri* Benth. (1842).
Vernacular names: ḥareyr (Ẓufari Arabic); ḥareyr, tulh, tur (Jibbālī).

Description: Large shrub, up to 1 m, crown flat-topped; bark brown-white, fissured. Stipular thorns paired, straight or slightly curved, up to 6 mm, grey. Leaves with 3–4 pairs of pinnae; leaflets 3–16 pairs, leaflets ± 0.5–0.75 mm, oblong. Inflorescence of globose heads, 1–1.5 cm in diameter, shortly pedunculate; flowers cream to pale yellow. Calyx ± 1 mm, 5-lobed. Corolla 2–3 mm. Pod 4–6 × 1–1.5 cm, 2–4-seeded, slightly constricted in between the seeds, greenish brown, pubescent, dehiscent. Seeds 5–6 mm, ovoid, brown.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, in the low dry hills and rocky slopes with *Acacia*, *Boswellia* and *Dracaena*. *Altitude*: 60–450 m. Distributed in NE Africa and from Egypt south to Tanzania, extending though Arabia east to Iran. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map: 304.

Notes: Boulos (Kew Bull. 50(2): 334 (1995)) has separated some of the Yemen and Oman material under var. *brevifolia* Boulos, differing from the typical variety by their longer stipular thorns, shorter leaf rachis, fewer pinnae and longer, narrower pods. The material that I have seen mainly has fewer pinnae, but this character is fairly variable. Much more material needs to be collected and examined if this variety is to be recognized. A characteristic feature of this species is that an unpleasant smell is emitted when a cut is made.

The name of this species was based on a specimen collected from Yemen (Dahi) by Forsskål (missing from C), and a neotype, Yemen, *Radcliffe & Henchie* 4932 (K) chosen by J.R.I. Wood in Kew Bull. 37: 3 (1982).

6. ***Acacia ehrenbergiana*** Hayne, Darst. Beschr. Arzneik. Gewachse 10: t. 29 (1827).
Synonyms: *Acacia flava* Schweinf. (1896).
Vernacular names: salam, selem; ḥerthēt (Harsūsī).

Description: Large shrub, 2–4 m; bark reddish-brown, fissured, pubescent to glabrous. Stipular thorns paired, straight, white-grey, 2–5 cm long. Leaves with 2, sometimes 4, pairs of pinnae; leaflets 5–10 pairs, each leaflet 2–3 mm, oblong, glabrous. Inflorescence of globose heads 1–1.5 cm across, pedunculate; flowers yellow. Calyx ± 1 mm. Corolla 2–3 mm. Pods 5–10 × cm, falcate, straight to curved, somewhat constricted between the seeds, 6–7-seeded, reddish brown, dehiscent. Seeds 4–8 mm, ovoid, dark-brown, minutely white-puberulous.

Flowering and fruiting: March to April.

Distribution and habitat: Throughout Oman, in the foothills, wadis, and sandy and gravel plains, with *Acacia tortilis*, *Commiphora* and other wadi vegetation. Common and dominant

part of the woody vegetation in the central desert. *Altitude*: 50–1500 m. Distributed from Egypt, Ethiopia, Sudan westwards to Mali and Mauritiana. Elsewhere in the Arabian Peninsula found in Qatar, Saudi Arabia, UAE.

Distribution map & Illustration: 305.

Notes: Wild collected seed of this species is held at the Millennium Seed Bank at Wakehurst Place, Royal Botanic Gardens, Kew.

7. ***Acacia nilotica*** (L.) [Willd. ex] Del., Fl. Aegypt. Ill. 79 (1813).
Vernacular names: qaraţ, qereţ, quruḍ, quruţ, ţalḥ, ţulḥ (also in Ẓufari Arabic and Jibbālī).

Description: Tree, up to 12 m, crown rounded; bark brown to grey-brown, rough and fissured; crown rounded. Stipular thorns paired, up to 8 cm, straight or deflexed, grey-white. Leaves pinnate, with 2–11 pairs of pinnae; leaflets 7–25 pairs, each leaflet 3–7 mm, oblong. Inflorescence of globose heads, axillary, 1–1.5 cm across, pedunculate with 2 bracts at about one third the length of the peduncle, mildly fragrant; flowers yellow. Calyx ± 1mm. Corolla ± 3 mm, 5-lobed. Pod 8–17 ×1–2 cm, straight or slightly curved, 10–15-seeded, constricted in between the seed containing segments or crenate to straight-sided, tardily dehiscent.

One of the most widespread and variable species with several subspecies recognised on pod characters and indumentum. The following subspecies are found in Oman (see also the treatment in Flora of Tropical East Africa, op. cit., and Miller & Morris op. cit).

a. Pods strongly constricted in between the seeds, appearing beaded, black or green at maturity, pubscent or glabrous
  b. Pods glabrous .....7a. **Acacia nilotica** subsp. **nilotica**
  b. Pods densely white-pubescent .....7b. **Acacia nilotica** subsp. **indica**
a Pods shallow crenate to straight-sided, black at maturity, minutely pubescent .....
  .....7c. **Acacia nilotica** subsp. **kraussiana**

7a. ***Acacia nilotica***
subsp. ***nilotica*** (Benth.) Brenan, Kew Bull. 1957: (1957).

Flowering and fruiting: September.

Distribution and habitat: Southern Oman, Dhofar on the coastal plains. *Altitude*: ± 50 m. Distributed throughout tropical and subtropical Africa, to SW Pakistan and India. Elsewhere in the Arabian Peninsula found in Saudi Arabia, UAE, Yemen. Also found on Soqotra.

Distribution map: 306.

7b. ***Acacia nilotica***
subsp. ***indica*** (Benth.) Brenan, Kew Bull. 1957: 84 (1957).
Synonyms: *Acacia arabica* (Lam.) Willd. var. *indica* Benth. (1842).
Vernacular names: ţalh.

Flowering and fruiting: September to November.

Distribution and habitat: Northern and southern Oman, on the Batinah and at several locations on the eastern coastal regions of northern Oman. *Altitude*: 50–100 m. Distributed throughout tropical and subtropical Africa, to SW Pakistan and India. Elsewhere in the Arabian Peninsula found in Saudi Arabia, UAE, Yemen.

Distribution map & Illustration: 307.

Notes: Often cultivated in private gardens and by villages. Wild collected seed of this species is held at the Millennium Seed Bank at Wakehurst Place, Royal Botanic Gardens, Kew. Resin, leaves and seeds have been used in traditional medicine for cataracts, as a demulcent, for treating diarrhoea, diabetes, cough and toothache.

7c. ***Acacia nilotica***
subsp. ***kraussiana*** (Benth.) Brenan, Kew Bull. 12: 84 (1957).
Synonyms: *Acacia arabica* (Lam.) Willd. var. *kraussiana* Benth. (1842), non *A. kraussiana* Benth.

Flowering and fruiting: June to September; fruit ripening in September.

Distribution and habitat: Southern Oman, in Dhofar, on the lower altitudes of the escarpment, and on coastal hills and plains, often by springs, sometimes forming the dominant tree. *Altitude*: 10–150 m. Distributed throughout tropical Africa. Elsewhere in the Arabian Peninsula found in Yemen.

Distribution map: 308.

Notes: The pods have been used in tanning leather and the wood in the manufacture of lime, and for making house posts and other utilitarian objects. The leaves have been used in traditional medicine as poultice for boils and for relieving pain from inflammation.

8. ***Acacia etbaica*** Schweinf.
subsp. ***uncinata*** Brenan, Kew Bull. 12: 91 (1957).
Vernacular names: qaraṭ, qereṭ, quruḍ, quruṭ, samr, ṣa'b (also in Ẓufari Arabic and Jibbālī).

Description: Large shrub, up to 3 m; crown flat-topped; bark grey-reddish-brown, fissured. Stipular thorns paired, up to 5 mm, straight and curved. Leaves pinnate, in fascicles of 2–5; pinnae 5–7 pairs; leaflets 9–30 pairs, 0.5–4 × 1–1.5 mm, oblong. Inflorescence of axillary globose heads 7–10 mm across, pedunculate, pubescent; flowers cream to pale-yellow, fragrant. Calyx ± 1 mm. Corolla ± 3 mm; stamens well exserted. Pod 5–7 × 0.7–10 mm, flattened, 3–7-seeded, dark reddish-brown, or purplish brown, often glossy, with fine longitudinal lines, dehiscent. Seeds 4–5 mm, ovoid, brown.

Flowering and fruiting: September.

Distribution and habitat: Southern Oman, Dhofar, on open slopes in the *Boswellia-Dracaena* mixed shrubland, co-dominant with other woody shrubs; common in the drier areas of the escarpment mountain, especially in the Jebel Semhan area. *Altitude*: 50–1600 m. Distributed in tropical NE Africa (Somalia, Ethiopia), Egypt, Uganda and Kenya. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map & Illustration: 309.

Notes: All Oman plants are referable to subsp. *uncinata*, which is distinguished from the typical subspecies in its short ± hooked thorns intermixed with short and long straight spines. In the typical subspecies the thorns are all straight.

9. ***Acacia tortilis*** (Forssk.) Hayne, Arzneigew. 10: I, t. 31 (1827).
Basionym: *Mimosa tortilis* Forssk. (1775).
Vernacular names: samr(a), simr (also Ẓufari Arabic); ḥaroẓ, ḥarẓ (Harsūsī, Jibbālī).

Description: Small tree, single or multi-stemmed, up to 5 m, crown wide and flattened at the top; bark grey-brown-black, fissured, young branches pubescent. Stipular thorns paired, 2–8 cm long or smaller to ± 1 cm, straight, sometimes curved, white-grey. Leaves pinnate, in fascicles with 2–10 pairs of pinnae; leaflets 6–12 pairs, 0.5–1.5 mm, oblong, pubescent. Inflorescence of axillary globose heads 0.8–10 mm across, pedunculate, pubescent; flowers white. Calyx ± 1 mm, glabrous with hairs on lobes. Corolla ± 2 mm, glabrous with pubescent lobes. Pods 4–10 × 0.5–0.7 cm, spirally twisted or contorted, 5–8-seeded, reddish brown, densely pubescent, dehiscent. Seeds 4–5 mm, ovoid, reddish-brown.

Flowering and fruiting: April, fruits ripening in June.

Distribution and habitat: Throughout Oman, common in the foothills of the mountains, gravel plains and in sandy regions, and in the dry north facing foothills of the Dhofar mountains, occasional above 1500 m in the north and absent from the wet escarpment mountains in Dhofar. On the Batinah in northern Oman, relatively dense *Acacia tortilis* woodlands are present. *Altitude*: 20–1500 m. Distributed throughout Africa, to Palestine and Israel. Elsewhere in the Arabian Peninsula found in Bahrain, Qatar, Saudi Arabia, UAE, Yemen.

Distribution map & Illustration: 310.

Notes: Foliage is browsed by all livestock; pods are used for fodder. Oman plants belong to subsp. *tortilis* Brenan which differs from var. *spirocarpa* (Hochst. ex A.Rich.) in its non-glandular pods.

Wild collected seed of this species is held at the Millennium Seed Bank at Wakehurst Place, Royal Botanic Gardens, Kew.

10. ***Acacia gerrardii*** Benth., Trans. Linn. Soc. 30: 508 (1875).

Description: Tree, up to 6 m, crown somewhat flattened; bark dark brown, fissured and cracking. Stipular thorns paired, up to 8 cm, grey-white. Leaves with 5–12 pairs of pinnae; leaflets 12–28 pairs, 1.5–2 mm, oblong, ± densely pubescent. Inflorescence of axillary globose heads, ± 2 cm across, pedunculate, peduncle pubescent; flowers white to pale-yellow, mildly fragrant. Calyx ± 2 mm. Corolla ± 3 mm. Pod 4–15 ×1–1.5 cm, falcate, slightly curved, ± 12-seeded, dark red to reddish brown, mostly puberulous, dehiscent. Seeds ± 7 mm, ovoid, compressed.

Distribution: Distributed from Iran through the Arabian Peninsula to Sudan and Ethiopia, southwards to Natal, and westwards to Nigeria.

A widely distributed and variable species with several infraspecific categories recognisable in Africa and western Asia. The full and correct identity of Oman species is not clear. The northern Oman plants differ from the southern plants in rachis and petiole length, and pod dimensions, but there are variations amongst the southern Oman plants. Until more studies, possibly at the molecular level, are conducted, I prefer to use a wider species concept and treat all Oman plants under *A. gerrardii* recognising two subspecies.

a. Rachis 2–6 cm; pinnae 5–10 pairs; attachment of leaflets to the petiolules slightly eccentric . . . . . 10a. **A. gerrardii** subsp. **gerrardii**

a. Rachis 0.5–1.5 cm; pinnae 2–7 pairs; attachment of leaflets to the petiolules eccentric . . . . . 10b. **A. gerrardii** subsp. **negevensis**

10a. **A. gerrardii** Benth.
subsp. **gerrardii**

Synonyms: *Acacia pachyceras* O. Schwartz (1939); *A. gerrardii* Benth. subsp. *negevensis* Zohary

var. *najdensis* Chaudhary (1983); *A. pachyceras* var. *pachyceras* Boulos (1995).
Vernacular names: ţalḥ., ţulḥ..

Flowering and fruiting: April to June.

Distribution and habitat: Southern Oman, on the drier areas of the escarpment. *Altitude*: ± 800 m. Distributed from Iraq, Sudan, Ethiopia to Natal, and westwards to Nigeria. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map: 311.

Notes: Apparently not common in Oman. The Oman material that I have seen differs from the typical subspecies in having smaller leaves, but the pods characters are similar. It also comes close to *A. johnwoodii* Boulos.

10b. **A. gerrardii** Benth.
subsp. **negevensis** Zohary, Israel J. Bot.13: 39 (1964).
Synonyms: *A. negevensis* Zohary (1962) nom. nud; *A. iraqensis* Rech. f. (1964); *A. gerrardii* Benth. subsp. *negevensis* Zohary var. *najdensis* Chaudhary (1983); *A. pachyceras* var. *najdensis* Boulos (1995).
Vernacular names: naghl (in the eastern Hajar area, Ja'alan and Jebel Qahwan), ţalḥ., ţulḥ..

Flowering and fruiting: April to June; fruit ripening in September.

Distribution and habitat: Northern Oman, common on the Hajar mountains, rocky gorges with *Olea*, *Sideroxylon* and *Dodonaea*. *Altitude*: 800–2500 m. Distributed in Iraq, Israel, Palestine, Jordan. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Kuwait; expected to occur on the hills in UAE.

Distribution map & Illustration: 312.

Notes: Resin (gum) and pods have been used in traditional medicine for treating sore gums, loose teeth, burns and fevers. Young pods are used for fodder for goats.

Wild collected seed of this species is held at the Millennium Seed Bank at Wakehurst Place, Royal Botanic Gardens, Kew.

Cultivated species

Acacia farnesiana (L.) Willd.
Shrub to 2 m, with stipular thorns and 2–7 pairs of pinnae. Flowers fragrant, bright yellow, in globose heads. Pods dark brown, subterete and almost woody. A native of South America, pantropical in distribution. In Oman cultivated in private and public gardens.

Acacia auriculiformis A. Cunn. ex Benth.
Tree up to 5 m, unarmed, with flattened cladodes (modified petioles). Flowers yellow, in spikes. Pods falcate, 6–12 cm, and seeds with prominent orange aril. A native of Australia, widely cultivated in private and public gardens in Oman.

Albizzia lebbeck (L.) Benth.
Tree up to 15 m, unarmed, with bipinnate leaves. Flowers fragrant, pale-yellow to green-yellow, in globose heads. Pods 15-30 cm, flattened, glossy pale-yellow. Native to tropical Asia, naturalized in many tropical regions. In Oman, cultivated in public gardens and beside roads, but not very common as it is deciduous. An old, large tree still exists in Nizwa underneath which the traditional goat market used to be held.

Leucaena leucocephala (Lam.) de Wit
Tree up to 4 m, with bipinnate leaves and fragrant, pale yellow flowers in globose heads. Pod 8–15 cm, pale brown. A native of South America, pantropical in distribution. In Oman this profusely flowering, fast growing tree is cultivated by roads, private parks and gardens. It tolerates the high temperatures (up to 50°C) of Muscat area.

Pithecellobium dulce (Roxb.) Benth.
Tree to 5 m, with bipinnate leaves and stipular thorns. Flowers creamy or pale-yellow, in globose heads. Pods spirally twisted, dehiscent and exposing the black seeds with a red fleshy edible aril. A native of South America, cultivated and naturalized in many tropical areas. In Oman cultivated in private and public gardens. The tangy fleshy aril is sometimes eaten.

43. **Caesalpiniaceae** (Leguminosae: Caesalpinioideae)

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Key to the genera of Caesalpiniaceae in Oman

1. Flowers apetalous ..... 4. **Ceratonia**
1. Flowers with petals
   2. Flowers with 10 perfect stamens
      3. Trees, unarmed; petals unequal, ± 4 cm; pods 10–20 cm ..... 2. **Delonix**
      3. Shrubs, armed; petals subequal, 4–8 mm; pods 3–7 cm ..... 1. **Caesalpinia**
   2. Flowers with 3–7 perfect stamens, the remaining reduced to staminodes or not properly developed
      4. Herbs or small shrubs; sepals 5; petals 5; perfect stamens more than 5, filaments free ..... 3. **Senna**
      4. Trees; sepals 4; petals 3 developed, lower 2 minute; perfect stamens 3, filaments fused in the lower half to form a tube ..... 5. **Tamarindus**

1. **Caesalpinia** L.

About 100 species distributed throughout the tropical and subtropical regions.

Leaves pinnate; pod 3–5 cm broad, broadly ovate-cylindric, densely covered with long prickles ..... 1. **C. bonduc**
Leaves bipinnate; pod 9–11 mm broad, flattened, smooth ..... 2. **C. erianthera**

1. ***Caesalpinia bonduc*** (L.) Roxb., Fl. Ind. 2: 362 (1832).
Basionym: *Guilandinia bonduc* L. (1753).

Description: Shrub or small tree, up to 2 m; stems and branches woody, straggling, armed with straight or recurved spines or prickles. Leaves paripinnate with 3–9 pairs of leaflets; leaflets 30–45 × 15–20 mm, ovate-lanceolate, apex rounded to emarginate, mucronate. Stipules with leafy lobes. Flowers in terminal or axillary racemes. Sepals 5–7 mm, oblong. Petals bright yellow, 8–10 mm, red-spotted. Pod 5–7 × 3–5 cm, broadly ovate-cylindric, densely covered with 5–7 mm long prickles. Seeds grey, ± 20 × 16 mm, subglobose, smooth.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, in the escarpment woodlands. Often planted as a hedge in northern Oman in some coastal villages in the eastern Hajar. Not common. *Altitude*: 10–500 m. Distributed throughout the tropics. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map & Illustration: 313.

2. ***Caesalpinia erianthera*** Chiov., Fl. Somala 155 (1929).
Vernacular names: qiţayr, qiţir (Jibbālī).

Description: Shrub, up to 1 m; stems and branches woody, spreading and forming clumps up to 2 m wide, armed with paired, straight or curved spines at the nodes; bark pale brown to grey. Leaves bi-paripinnate, each with 2–6 pairs of pinnae; each pinna with (2–)3–5 pairs of leaflets; leaflets 2–17× 2–12 mm, oblong-elliptic to suborbicular, apex rounded to emarginate, base unequal. Flowers in short terminal or axillary racemes. Sepals green tinged red, 3–10 mm, unequal, oblong, the lower longest and concave. Petals yellow-green, 4–8 mm, broadly ovate to suborbicular. Stamens 10, base of filaments and anthers densely white-woolly. Pod 20–45 × 9–11 mm, flattened, glabrous, reddish at maturity, 5–6-seeded.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, in the dry valleys, rocky hills and plains, in *Acacia* scrub. *Altitude*: 50–300 m. Distributed in NE Africa. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map & Illustration: 314.

Notes: The leaves and pods are toxic to livestock. Traditionally the heartwood of the plant has been used as a substitute *ud* wood (*Aquilaria agallocha*) for the preparation of incense, and ash of dead wood made into a lotion (with water) to treat skin abrasions and sores such as those resulting from scabies, ringworm or infected lice bites (Miller & Morris, op. cit.).

Cultivated species

Caesalpinia pulcherrima (L.) Sw. (1791).
Common English name: Pride of Barbados.
Large glabrous shrub, unarmed or with a few spines and prickles. Flowers in terminal racemes, red, scarlet-red or yellow and scarlet-red staminal filaments. Pods 7–12 cm long. A native of tropical America,

cultivated in most parts of the tropics, becoming naturalized. Commonly cultivated in Oman in private and public gardens. *Flowering & fruiting:* December to March.

2. **Delonix** Raf.
10 species distributed in tropical Africa, Madagascar and India.

Delonix elata (L.) Gamble, Fl. Madras 396 (1919).
Basionym: *Poinciana elata* L. (1753).
Vernacular names: erir, eyrīr (Jibbālī).

Description: Tree, up to 5 m, with a rounded spreading crown; bark brown to grey. Leaves bipinnate, ± 12 cm long with 2–7(–12) pairs of pinnae; leaflets 5–15(–25) pairs, each leaflet 8–16 × 3–6 mm, oblong, apex with a small mucro, base unequal. Flowers in short axillary corymbose racemes, large and showy. Sepals 5, 26–28 mm, oblong. Petals white to pale yellow, turning yellow-orange, unequal, ± 4 cm, shortly clawed, rounded with an undulate margin and somewhat lacerate margin, the upper petal folded on itself making a tube, darker in colour. Stamens 10, filaments red, exserted. Pod 11–22 × 2–4 cm, oblong, flattened, velvety, brown at maturity. Seeds 12–15 mm, flattened, pale brown mottled dark brown.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, on the seaward facing slopes of the wet escarpment mountains, in *Anogeissus* woodland. Common. *Altitude*: 200–850 m. Distributed from India to tropical Africa. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map & Illustration: 315.

Notes: An attractive tree, cultivated in Salalah on avenues. Also cultivated in the Muscat area where it flowers and fruits, but is not commonly planted. Browsed by camels, and foliage fed to cattle in Dhofar as it is one of the first trees to leaf at the onset of monsoons. The unripe pods are edible, and an infusion of leaves has been used in traditional medicine for difficult childbirth; also used as an oxytoxic for livestock especially goats.

Cultivated species

Delonix regia (L.) Raf. (1836)[1837].
Large tree, with leaves with many small leaflets. Spectacular when flowering as the flowers are large, red and very showy and come up after leaf-fall. A native of Madagascar, cultivated throughout the tropics. Not commonly cultivated in Oman.

3. **Senna** Miller
About 240 species distributed in the tropics, most abundant in the Americas; poorly represented in Asia and Oceania.

1. Pod less than 5 cm long, flat, thin and papery
   2. Pod 25–40 mm, pubescent, without a longitudinal crest in the middle . . . . . .4. **S. holosericea**
   2. Pod 12–20 mm, glabrous with a longitudinal crest in the middle . . . . . .3. **S. italica**
1. Pod more than 5 cm long, subterete or subtetragonous, not papery

3. Leaflets 4–12 pairs; gland on rachis absent; inflorescence of 4–10-flowers . . . . . .2. **S. sophera**
3. Leaflets 3 pairs; a small dark slender gland present on the rachis between the lowest pair of leaflets on the upper surface; inflorescence of 1–2 flowers . .1. **S. obtusifolia**

1. ***Senna obtusifolia*** (L.) Irwin & Barneby, Mem. New York Bot. Gard. 53: 252 (1982).
Basionym: *Cassia obtusifolia* L. (1753).
Synonyms: *Cassia tora* sensu auct., non L., Anth. (1935).
Vernacular names: fasul al ḍawā.

Description: Perennial herb or shrub up to 1.5 m, with a woody basal stem; stems erect, branched, pubescent. Leaves paripinnate with 3 pairs of leaflets; leaflets 15–45 × 8–33 mm, obovate, apex rounded to emarginate, mucronate, sparsely appressed pubescent or glabrous; a small dark slender gland present on the rachis between the lowest pair of leaflets on the upper surface; stipules linear. Flowers yellow, in 4–10-flowered racemes, in the axils of leaves; pedicels 2–4 mm. Sepals 4–6 mm. Petals 10–12 mm, obovate. Stamens 3 lower with longest filaments, 4 medium and 3 very small. Pod 15–20 × 0.3–0.5 cm, subterete, straight or curved, glabrescent, yellow-green, dehiscent, many-seeded.

Flowering and fruiting: October to November.

Distribution and habitat: Southern Oman, in the escarpment woodlands, summit grasslands, and rocky coastal plain. *Altitude*: 50–850 m. A pantropical weed (except in Polynesia and Australia). Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map & Illustration: 316.

Notes: Browsed by goats. Wild collected seed of this species is held at the Millennium Seed Bank at Wakehurst Place, Royal Botanic Gardens, Kew.

2. ***Senna sophera*** (L.) Roxb., Fl. Ind. ed. 2, 347 (1832).
Basionym: *Cassia sophera* L. (1753).

Description: Perennial herb or subshrub, up to 1.5 m; stems erect, branched. Leaves paripinnate with 4–10 pairs of leaflets; leaflets 18–40(–55) × 7–15(–18) mm, increasing in size upwards, lanceolate, apex acute, glabrous or with a few hairs. Flowers yellow, in 1–2-flowered racemes present in the axils of upper leaves; pedicels 2–4 mm. Sepals obovate. Petals 5–10 mm, obovate. Stamens 3 large, 4 medium and 3 very small. Pods 15–11 × 0.5–0.7 cm, subterete with thicker yellowish edges and a small beak, straight or curved, glabrescent, tardily dehiscent or not, septate, many-seeded.

Flowering and fruiting: April.

Distribution and habitat: Northern Oman, in cultivated and disturbed land. *Altitude*: ± 50 m. Distributed in tropical Africa, Iraq to India, Burma, Japan, Australia and Polynesia. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map: 317.

Notes: Apparently not common, with no vernacular name recorded for this species. I have only seen a single specimen, collected from Muscat by Aucher-Eloy 4968 (K) in 1838.

3. ***Senna italica*** Miller, Gard. Dict. ed. 8, Senna No. 2 (1768).
Synonyms: *Cassia aschrek* Forssk. (1775); *C. obovata* Collad. (1816); *C. italica* (Miller) F.W. Andrews (1952).
Vernacular names: 'ashrek, 'ishriq, kharkhāsh, senemukkiy, shajarat ad dabb.

Description: Perennial herb or subshrub, 30–60 cm; stems erect to ascending, branched, pubescent. Leaves paripinnate with 2–6 pairs of leaflets; leaflets (5–)8–22(–25) × 5–18 mm, oblong-lanceolate or obovate, apex rounded to emarginate, mucronate, appressed pubescent; stipules 4–5 mm, ovate to triangular. Flowers yellow in terminal and axillary racemes; pedicels 3–4 mm. Sepals 4–6 mm. Petals 8–15 mm. Stamens 4 large, 4 medium and 3 small. Pod 25–50 × 10–18 mm, flattened, oblong, curved, sparsely pubescent, with a longitudinal ridge of crests along the middle of pod, 5–8-seeded, tardily dehiscent.

Flowering and fruiting: February to April; September to October.

Distribution and habitat: Throughout Oman, in gravel and sandy plains, and disturbed places. Weedy, but not common. *Altitude*: 30–400 m. Distributed in N and W Africa, SW Asia and Macaronesia. Elsewhere in the Arabian Peninsula found in Bahrain, Qatar, Saudi Arabia, UAE, Yemen.

Distribution map & Illustration: 318.

Notes: Not the true sennamukky, which is *C. senna* L. (also found in Yemen and Saudi Arabia), but often called by that name. The leaves and seeds have been used in traditional medicine to treat constipation and stomach cramps.

4. ***Senna holosericea*** (Fresen.) Greuter, Willdenowia 15: 429 (1986).
Basionym: *Cassia holosericea* Fresen. (1839).
Synonyms: *Cassia oocarpa* Baker (1895), Type from Oman, Dhofar, Mirbat coast, J.T. Bent 69 (K).
Vernacular names: 'ashrikeh, 'ashrikel, ferrot (Jibbāli); 'ishriq, kharkhāsh .

Description: Perennial herb or subshrub, 30–60 cm; stems erect to ascending, branched, pubescent. Leaves paripinnate with 4–8(–9) pairs of leaflets; leaflets (10–)12–21 × (5–)7–10 mm, oblong-elliptic to oblong lanceolate or obovate, apex rounded to emarginate, mucronate, pubescent; stipules 4–7 mm, subulate. Flowers yellow in terminal and axillary racemes; pedicels 3–4 mm. Sepals 3–4 mm. Petals 4–8 mm, obovate. Stamens 3 small, 4 medium and 4 large. Pod 32–35 × 20–24 mm, flattened, oblong, slightly curved, densely pubescent, lacking the longitudinal ridge of crests on the pod, 5–8-seeded, dehiscent.

Flowering and fruiting: September to November.

Distribution and habitat: Throughout Oman, and on the offshore islands of Masirah and Halaniyah, on rocky hill slopes, gravel plains, shallow runnels and sandy coastal plains. *Altitude*: 0–800 m. Distributed throughout N Africa and SW Asia. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map & Illustration: 319.

Notes: Common and unpalatable to livestock. The leaves and seeds have been used in traditional medicine as a laxative, and for treating nervous diseases. The seeds are edible but have a laxative action if taken in large doses.

Cultivated species

Senna alata (L.) Roxb. (1832).
Large shrub with large compound leaves and obovate leaflets. Flowers yellow in terminal racemes. Cultivated in Oman in private and public gardens. *Flowering & fruiting:* December to March.

4. **Ceratonia** L.

2 species; 1 species native of the Mediterranean region, cultivated and naturalised in N Africa and parts of Arabia, the other native to southern Arabia and NE Africa.

Ceratonia oreothauma subsp. ***oreothauma*** Hillcoat, Lewis & Verdc., Kew Bull. 35(2): 261–265 (1980).
Vernacular names: ţiyu.

Description: Monoecious or dioecious, small evergreen tree, up to 4 m. Leaves paripinnate with 3–5 pairs of leaflets; leaflets 12–16 × 3–4 mm, elliptic to oblong-elliptic, acute, base tapering, shortly petiolulate, glabrous and viscid above, puberulous beneath. Flowers unisexual, in long racemes. Calyx 5-lobed, pubescent. Petals absent. Male flowers: racemes 40–50 mm; stamens 5 with 3–4 mm long filaments. Female flowers: staminodes minute; stigma u-shaped. Pod 7–20 cm, slightly curved, thick, reddish-brown. Seeds embedded in pulp.

Flowering and fruiting: April to May, pods maturing in June.

Distribution and habitat: Northern Oman, Eastern Hajar, on Jabal Bani Jabir, in wadis, shallow gorges and at the summit. *Altitude*:1500–2000 m. Distributed in SE Yemen in the Hadramaut and Somalia. Not found elsewhere (except SE Yemen) on the Arabian Peninsula.

Distribution map & Illustration: 320.

Notes: A regional endemic. The main distribution of the species lies in the eastern Hajar mountains of northern Oman. An isolated population (reportedly only of a single or two trees) is recorded from the Hadhramaut. In Oman, the species is an isolated relic with a second subspecies, subsp. *somalensis*, occurring in Somalia.

A part of the population of *Ceratonia oreothauma* subsp. *oreothauma* is present in a nature reserve on the eastern Hajar in Oman (The Wadi Siren Nature Reserve). The population on Jabal Bani Jabir does not show much regeneration and I have seen many trees that are damaged through over-harvesting of the nutritious pods and foliage used as fodder. At present the species is placed as Data Deficient on the IUCN and National Red List Categories. The population on eastern Hajar should be mapped for the proper monitoring and conservation of this potentially economically important species.

Wild-collected seed of this species is held at the Millennium Seed Bank at Wakehurst Place, Royal Botanic Gardens, Kew.

5. **Tamarindus** L.

Monotypic, distributed throughout the tropics; cultivated and naturalised in many parts of the world.

Tamarindus indica L., Sp. Pl. 34 (1753).
Vernacular names: areyr (Jibbālī), şebbār (also Ẓufari Arabic), şubr, şor (Jibbālī), tamr hindi, tur hindi, tur iyyel (also Jibbālī).

Description: Tree, up to 20 m, evergreen; bark brown-black, rough and fissured; crown

rounded, spreading. Leaves paripinnate with 8–20 pairs of leaflets; leaflets 8–15 × 4–5 mm, oblong, apex rounded, mucronate, base unequal. Flowers in terminal racemes. Sepals 4, pale yellow, reflexed. Petals 5, the upper 3 petals larger, 8–13 × 4–6 mm, oblong-ovate, pale yellow or white with orange-red veins, the lower two minute. Stamens 3, filaments united to about half their length, alternating with 5 small staminodes. Pods 2–16 cm long, with a mealy surface, oblong, irregularly constricted between the seeds, 2–10-seeded, indehiscent, greenish-brown. Seeds embedded in acidic pulp, 10–15 mm, rhomboid, flattened, glossy chestnut-brown.

Flowering and fruiting: April to May.

Distribution and habitat: Southern Oman, Dhofar, on the wet escarpment, by water courses, in woodland with *Anogeissus*, *Delonix*, and *Ficus*. Cultivated in many parts of the country, in villages and private homes. *Altitude*: ± 800 m. Native of tropical Africa, introduced and naturalized throughout the tropics and subtropics. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map & Illustration: 321.

Notes: The fruits (pods) were used in traditional medicine as a laxative, vermifuge and as a blood purifier, and plaster for bone fractures was prepared from the seeds. Cultivated in many Asian and African countries for its acidic fruit pulp used as condiment in many Asian dishes, and for making refreshing drinks.

Cultivated species

Parkinsonia aculeata L. (1753).
A small evergreen tree with somewhat pendulous branches and small leaflets on long rachis. Flowers bright yellow and mildly fragrant. Pod up to 15 cm. A native of tropical America, cultivated and naturalized in many tropical and subtropical regions. Commonly cultivated in Oman in private and public gardens. *Flowering & fruiting:* December to March.

44. **Fabaceae** (Papilionaceae; Leguminosae: Papilionoideae)

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Key to the genera of Fabaceae in Oman

1. Leaves simple, 1-foliolate or absent
   2. Anthers alternately long and short; keel (carina) of flower markedly beaked; pod inflated . . . . . 17. **Crotalaria**
   2. Anthers of same length; keel (carina) of flower not as above; pod not inflated
      3. Anthers apiculate; at least some hairs biramous; corolla often red or orange-red . . . . . 4. **Indigofera**
      3. Anthers not apiculate; hairs simple or absent; corolla variously coloured
         4. Pod constricted (sometimes obscurely so) in between the seeds sometimes irregularly, often breaking into 1-seeded segments or not breaking
            5. Segments covered with soft straight or hooked spines to 2 mm . . . . . 22. **Taverniera**
            5. Segments ± pubescent, never with straight or hooked spines
               6. Plant with lateral stems becoming spinescent; calyx herbaceous . . . . . 7. **Alhagi**
               6. Stems not as above; calyx scarious . . . . . 10. **Alysicarpus**
         4. Pod not constricted in between the seeds . . . . .
            7. Leaflets with many closely parallel, oblique lateral nerves running to the margins . . . . . 3. **Tephrosia**
            7. Leaflets with open venation
               8. Leaflets with sinuate or dentate margins; pod ovoid, pitted . . . 18. **Psoralea**
               8. Leaflets with entire margins; pod cylindrical, not pitted . . . 14. **Rhynchosia**
1. Leaves pinnate or digitate
   9. Leaves pinnate with leaflets arising from separate points, or sometimes 2-foliolate with the rachis prolonged between them
      10. Leaves paripinnate (terminal leaflet absent) (rachis sometimes extending as a mucro) . . . . . 5. **Sesbania**
      10. Leaves imparipinnate (terminal leaflet present)
         11. Anthers apiculate; at least some hairs biramous . . . . . 4. **Indigofera**
         11. Anthers not as above; hairs simple
            12. Leaflets with many closely parallel, oblique lateral nerves up to the leaf margin . . . . . 3. **Tephrosia**
            12. Leaflets with open venation
               13. Pod with numerous deep circular sinuses along the margin . . . . . 28. **Hippocrepis**
               13. Pod entire, not as above
                  14. All petals ± similar; leaflets 20–50 . . . . . 1. **Cadia**
                  14. Petals differentiated into an upper standard petal, 2 lateral wings and 2 lower keel petals
                     15. Pod stipitate, constricted into 1–2 indehiscent segments; branches with hairs with prominent swollen bases appearing as tubercles . . . . . 6. **Ormocarpum**
                     15. Characters not as above
                        16. Leaf rachis usually zigzag with 3–5 leaflets; pod papery with prominent veins . . . . . 2. **Dalbergia**
                        16. Leaf and pod not as above
                           17. Leaf rachis ending in a branched tendril . . . . . 29. **Vicia**
                           17. Leaf rachis not ending in a tendril

18. Leaflets 0.5–2 mm, obovate to suborbicular .....24. **Podolotus**
18. Leaflets more than 2 mm long, usually oblong to oblong ovate ..23. **Astragalus**
9. Leaflets digitately 2–many-foliolate with all leaflets arising from the same point; rachis not prolonged beyond leaflets
19. Leaf rachis spiny; flowers surrounded by an involucre of spine-tipped bracts (in Oman) .....8. **Ebenus**
19. Leaf rachis not spiny
20. Leaves glandular or pellucid-punctate on the lower surface
21. Fruits 2-valved, dehiscent, 2- or more-seeded .....14. **Rhynchosia**
21. Fruits indehiscent, 1-seeded .....19. **Psoralea**
20. Leaves not glandular or pellucid-punctate
22. Plant glandular-pubescent, at least above; filaments all united ..15. **Ononis**
22. Plant not glandular; upper filament free
23. Fruit spirally coiled .....25. **Medicago**
23. Fruit not spirally coiled
24. Petals persistent; claws of wing and keel ± adnate to the staminal tube; base of stipules encircling the stem (cultivated, found as an escape) .....25. **Trifolium**
24. Petals falling soon; claws of wing and keel not as above; base of stipules not as above
25. Anthers alternately long and short
26. Calyx 2-lipped, the lower lip 3-fid .....18. **Argyrolobium**
26. Calyx not 2-lipped .....17. **Crotalaria**
25. Anthers uniform in size
27. Pod segments covered with soft, straight or hooked spines to 2 mm .....22. **Taverniera**
27. Pod segments not spiny
28. Pod transversely jointed, with (1–)2-many segments ....9. **Desmodium**
28. Pod not as above .....(go to 29)
29. Alternate anthers sterile; pod linear .....11. **Teramnus**
29. All anthers fertile
30. Style with a reflexed appendage beyond the stigma; keel incurved ....12. **Vatovaea**
30. Style not as above
31. Climbing herbs; stipules peltate .....13. **Vigna**
31. Annual or perennial herbs, not climbing
32. Flowers 1–2, axillary (except *Lotus corniculatus*)
33. Leaves 5-foliolate, the two at the base stipule-like .....20. **Lotus**
33. Leaves 3–4-foliolate, 4th leaflet inserted below the terminal 3 leaflets ....21. **Pseudolotus**
32. Flowers more than 2, in axillary and terminal clusters or racemes
34. Pod reticulately veined .....26. **Melilotus**
34. Pod smooth
35. Pod about the same length as calyx; flowers in terminal capitate clusters .....16. **Lotononis**
35. Pod elongate, usually more than twice the length of calyx; flowers in axillary capitate clusters .....27. **Trigonella**

1. **Cadia** Forssk.
7 species; 6 in Madagascar; one distributed from Arabia to E Africa (Kenya).

Cadia purpurea (Picciv.) Ait., Hort. Kew. 3: 492 (1792).
Basionym: *Panciatica puupurea* Picciv. (1783).
Synonyms: *Cadia* (sp. without epithet) Forssk. (1775); *C. varia* L' Her. (1795); *C. arabica* Raeusch (1797).

Description: Unarmed shrub 1–1.5 m; stems branched, leafy. Leaves imparipinnate with up to 50 pairs of leaflets; leaflets 10–15 × 2–3 mm, oblong, apex emarginate, dark green and glabrous above, pale green and puberulous beneath on the midrib and margins, the terminal leaflet oblong-cuneate. Flowers pendulous, on axillary short shoots. Calyx campanulate, 9–10 mm, lobes triangular, puberulous, dull pink. Petals oblong, subequal, ± 30 mm, white to cream aging pink to reddish, falling soon. Pods 12–13 × 1.1–1.3 cm, straight or slightly curved, beaked at the apex, glabrous, yellow-brown, valves twisting on dehiscence.

Flowering and fruiting: March to April.

Distribution and habitat: Southern Oman, Dhofar, on the escarpment mountains in *Anogeissus–Euclea* woodland. *Altitude*: 500–700 m. Distributed in N & E Ethiopia, Eritrea, Somalia, N Kenya. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map: 322.

2. **Dalbergia** L.f. (nomen. conserv.)
About 100 species, distributed throughout the tropical and subtropical regions of the world.

Dalbergia sissoo Roxb., Fl. Ind. 3: 332 (1832).
Vernacular names: mays.

Description: Tree up to 20 m. Bark fissured, rough, crown rounded. Leaves imparipinnate, with 3–5 leaflets, leaf rachis conspicuously zigzag; leaflets alternate, 3–6 × 3–6 cm, ovate, apex acute to acuminate, base rounded, glabrous. Flowers creamy-white, ± 5 mm across, in axillary panicles. Calyx 3–4 mm, greenish-yellow, glabrous. Corolla ± 8 mm. Pod 3–8 × 1–2 cm, flattened, papery with prominent veins, 1–3-seeded.

Flowering and fruiting: April to June.

Distribution and habitat: Northern Oman, in the western Hajar mountains at a few locations in Wadi Bani Awf where it was probably introduced. It is now naturalized but is restricted to edges of a few streams. *Altitude*: 550–750 m. Native of SE Asia, cultivated in warm tropical countries for its valuable wood which is hard and durable and commonly used for making furniture, boats, etc. Not recorded elsewhere in the Arabian Peninsula, but likely to be cultivated in Saudi Arabia and the UAE.

Distribution map & Illustration: 323.

3. **Tephrosia** Pers.
Over 300 species distributed mainly in the tropics and subtropics.

1. Leaves 1–foliolate. . . . . 1. **T. strigosa**
1. Leaves compound

2. Pod less than 15 mm long, densely pilose, 1-seeded . . . . . .7. **T. nubica**
2. Pod more than 15 mm long
   3. Flowers 1–2 in the axils of upper leaves; pod 28–30 mm, silky sericeous . . . . . .4. **T. quartiniana**
   3. Flowers more than 2 in axillary clusters or lax pseudo-racemes; pod generally longer than 30 mm
      4. Flowers in long pseudo-racemes
         5. Pod 40–52 mm; leaflets silvery . . . . . .5. **T. purpurea**
         5. Pod 40–45 mm; leaflets silvery on the lower surface . . . . . .6. **T. apollinea**
      4. Flowers in axillary clusters
         6. Leaflets 5–7; calyx 6–7 mm; pod pubescent . . . . . .2. **T. subtrifolia**
         6. Leaflets 7–9; calyx 3–4 mm; pod pilose . . . . . .3. **T. humilis**

1. ***Tephrosia strigosa*** (Dalz.) Santapau & Maheshw., J. Bomb. Nat. Hist. Soc. 54(3): 905 (1957).
Basionym: *Macronyx strigosus* Dalz. (1850).

Description: Annual or a short-lived perennial herb, up to 30 cm; stems branched, slender, spreading, sparsely pilose to pilose. Leaves 1-foliolate, green to pale green; petiole ± 2 mm; stipules lanceolate, pilose; leaflets 20–65 × 2–5 mm, lanceolate to oblong-lanceolate, entire, apex acute, apiculate, base obtuse to cuneate, sparsely pilose on the lower surface, glabrous above. Flowers ± 4 mm, mauve to pale purple, solitary or 2 in the axils of leaves; pedicels up to 15 mm, filiform, sparsely pilose. Calyx ± 2 mm, lobes ± 1 mm, lanceolate, the lowest lobe longest, appressed pilose. Pod 15–20 mm, flattened, sparsely to moderately pilose, beaked, valves twisting on dehiscence.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, on rocky mountain slopes, in *Anogeissus – Blepharispermum hirtum–Croton confertus* woodland; also on the coastal escarpment with *Dracaena* and *Acacia*. *Altitude*: 100–300 m. Distributed from Pakistan to Burma, Laccadive Islands. Elsewhere in the Arabian Peninsula found in Yemen. Also found on Soqotra.

Distribution map: 324.

2. ***Tephrosia subtrifolia*** Baker in Oliv., Fl. Trop. Africa 2: 117 (1871).

Description: Perennial herb, woody at base; stems ascending to ± erect, up to 40 cm, pubescent to ± glabrous. Leaves imparipinnate with 5–7 leaflets, grey-green; petiole up to 10 mm; stipules linear, pubescent; leaflets 20–45 × 4–10 mm, oblanceolate to oblong-lanceolate, entire, apex ± acute, apiculate, base obtuse to cuneate, appressed pubescent-sericeous on the lower surface, ± glabrous on the upper surface; young leaves densely sericeous. Flowers purple, 2–6 in clusters in the axils of leaves; pedicel 2–4 mm, shortly hispid. Calyx 6–7 mm, lobes 2–4 mm, triangular, acute, the lowest lobe longest, sparsely pilose. Corolla with standard petal ± 9 mm, pubescent on the dorsal surface; wings ± 7 mm. Pod 35–50 mm, flattened, slightly curved towards the apex, pubescent, valves twisting on dehiscence.

Flowering and fruiting: March to April; September to October.

Distribution and habitat: Northern and Southern Oman, in dry sandy and gravelly wadi beds, gravelly waste ground and low dry hills in *Commiphora–Acacia* shrubland. *Altitude*: 50–200 m. Distributed in W and tropical E and NE Africa westwards through Arabia to Pakistan, India

and Burma; Angola, Cape Verde Islands, and Madagascar. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen. Also found on Soqotra.

Distribution map: 325.

3. ***Tephrosia humilis*** Guill. & Perr., Fl. Seneg. Tent. i: 196 (1832).
Vernacular names: harār.

Description: Perennial herb, up to 50 cm; stems divaricately branched, slender towards the top, brownish-red, white-pubescent. Leaves imparipinnate, with 7–9 leaflets, grey-green; petiole up to 30 mm, slender; stipules ± 6 mm, linear-lanceolate, pilose; leaflets 15–35 × 3–9 mm, oblanceolate to oblong to oblong-lanceolate, entire, apex acute to obtuse, apiculate, base obtuse to cuneate, sparsely pubescent on the lower surface, glabrous on the upper surface. Flowers purple to pink-purple, in axillary clusters; pedicel ± 3 mm. Calyx 3–4 mm, lobes ± 1.5 mm, about twice as long as the tube, the upper two joined to 1/2 their length, lanceolate-linear, pubescent. Corolla with standard petal ± 6 mm, pilose on the dorsal surface; wings ± 6 mm. Pod 38–40 mm, flattened, slightly curved towards the apex, beaked, pilose, valves twisting on dehiscence.

Flowering and fruiting: March to April; September to October.

Distribution and habitat: Southern Oman, on the lower slopes of the escarpment mountains, in grassland and at the edge of *Euphorbia balsamifera* zone. *Altitude*: 80–300 m. Distributed from Sudan westward to Senegal. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map: 326.

Notes: Light browse for cattle.

4. ***Tephrosia quartiniana*** Cufod. ex Greuter & Burdet, Willdenowia 16: 446 (1987).

Description: Perennial herb, woody at base; stems ascending to prostrate and trailing, up to 40 cm, pubescent to hispid. Leaves imparipinnate with 5–9 leaflets, grey-green; petiole 5–6 mm; stipules linear, pubescent; leaflets, 4–7 × 3–5 mm, obovate to obovate-oblong, entire, apex rounded, emarginate, apiculate, base obtuse to cuneate, appressed pubescent sericeus. Flowers mauve to purple, 1–2 in the axils of upper leaves; pedicel 1–2 mm, shortly hispid. Calyx 2–3 mm, lobes ± 1.5 mm, linear, acute, the lowest lobe longest, pilose. Corolla with standard petal ± 5 mm, silky sericeous on the dorsal surface; wings ± 3 mm. Pod 28–30 mm, flattened, silky sericeous, beaked at the apex, valves twisting on dehiscence.

Flowering and fruiting: January to April; September to October.

Distribution and habitat: Northern and Southern Oman, in dry sandy and gravel wadi beds. *Altitude*: 50–500 m. Distributed in SE Egypt, N Sudan, Eritrea, Ethiopia, Mali, Niger. Elsewhere in the Arabian Peninsula found in Saudi Arabia.

Distribution map & Illustration: 327.

5. ***Tephrosia purpurea*** (L.) Pers. Syn. Pl. 2: 329 (1807)
subsp. ***leptostachya*** (DC.) Brummitt, Bol. Soc. Brot. sér. 2, 41: 245 (1968).
Synonyms: *Cracca purpurea* L. (1753) (basionym for *Tephrosia purpurea*); *Tephrosia leptostachya* DC., Prodr. 2: 251 (1825); *Tephrosia persica* Boiss. (1843); *T. purpurea* var. *pubescens* Bak. (1871); *T. haussknechtii* Bornm. (1894).

Vernacular names: ḍufr, ḍafrā.

Description: Perennial herb or small shrub, up to 1 m, woody below; stems erect to spreading, often wiry, variable in indumentum from sparsely appressed white-pubescent to moderately so. Leaves imparipinnate with 5–11 leaflets, glaucous; petiole up to 5 cm; stipules narrow triangular, pilose; leaflets 10–38 × 3–11 mm, oblanceolate to oblong-lanceolate, entire, apex subacute to obtuse or emarginate, apiculate, base obtuse to cuneate, appressed pubescent on the lower surface, sparse to glabrous on the upper surface. Flowers purple to pink- reddish-purple, in lax, leaf-apposed or axillary pseudo-racemes, up to 30 cm; bracts 3–4 mm, subulate; pedicels up to 4 mm, pubescent. Calyx 3–4 mm, lobes ± 2 mm, lanceolate, the lowest lobe longest, strigose to spreading pubescent. Corolla with standard petal ± 6 mm, pubescent on the dorsal surface; wings ± 4 mm. Pod 40–52 mm, flattened, slightly curved towards the apex, pubescent, 4–8-seeded, valves twisting on dehiscence.

Flowering and fruiting: February to April; September to October, but sometimes also at other times of the year.

Distribution and habitat: Northen and Southern Oman, and offshore on Al Halaniyah, in dry wadi beds, open stony desert, sandy depressions, gravel hill slopes, disturbed locations on wooded escarpment, and gravelly and sandy coastal areas. *Altitude*: 0–300 m. Distributed in Egypt, Sudan. Elsewhere in the Arabian Peninsula found in Saudi Arabia, UAE, Yemen.

Distribution map: 328.

6. ***Tephrosia apollinea*** (Del.) Link, Enum. Hort. Berol. Alt. 2: 252 (1822).
Basionym: *Galega apollinea* Del. (1814).
Vernacular names: ḍufr, ḍafrā.

Description: Annual or a short-lived perennial herb, up to 50 cm; stems erect to spreading, variable in indumentum, mostly white-pubescent. Leaves imparipinnate with mostly 5–7 leaflets, glaucous; petiole up to 5 cm; stipules narrow triangular, pilose; leaflets 15–45 × 4–11 mm, oblanceolate to oblong-lanceolate, entire, apex subacute to obtuse or emarginate, apiculate, base obtuse to cuneate, appressed pubescent on both surfaces, young leaves and stems and lower surfaces of leaves silvery. Flowers purple to pink-reddish-purple, in lax leaf-opposed or axillary pseudo-racemes, up to 20 cm; bracts 3–4 mm, subulate; pedicels up to 4 mm, pubescent. Calyx ± 4 mm, lobes ± 2 mm, lanceolate, the lowest lobe longest, strigose to spreading pubescent. Corolla with standard petal ± 6 mm, pubescent on the dorsal surface; wings ± 4 mm. Pod 40–45 mm, flattened, slightly curved towards the apex, pubescent, 5–8- seeded, valves twisting on dehiscence.
Flowering and fruiting: February to April; September to October, but sometimes also at other times of the year.

Distribution and habitat: Throughout Oman, including Musandam and the offshore islands of Masirah and Al Halaniyah, in dry gravelly and sandy wadi beds, coastal dunes, foothills of the northern mountains, disturbed and over-grazed locations in the central desert; common. *Altitude*: 0–500 m. Distributed in Somalia, tropical eastern Africa, Sudan. Elsewhere in the Arabian Peninsula found in Saudi Arabia, UAE, Yemen. Also found on Soqotra.

Distribution map & Illustration: 329.

Notes: The differences between *S. purpurea* and this species are minimal, and the two are difficult to separate, more so as herbarium material than in the field. In Oman the two taxa are ± sympatric, but *T. apollinea* can be recognized by its mostly smaller stature, mostly smaller pods

with fewer seeds and silvery leaves. The separating character of the distance between seeds of the two taxa and the length of the inflorescence does not hold good in Oman plants, and neither does the number of leaflets. *T. apollinea* comes closest to *T. purpurea* subsp. *dunensis* Brummitt (Bol. Soc. Brot. sér. 2, 41: 251 (1968)), and should be ultimately included within *T. purpurea*, at least the Oman plants, when treated for the flora of Arabia. Wild-collected seed of this species is held by the Millennium Seed Bank at Wakehurst Place, Royal Botanic Gardens, Kew, UK.

7. ***Tephrosia nubica*** (Boiss.) Baker in Oliv., Fl. Trop. Afr. 2: 125 (1871)
subsp. ***arabica*** (Boiss.) Gillett (see note)

Type: Oman, Muscat, Aucher-Eloy, no. 4456 (syntypes G, K, P).
Basionym: *Pogonostigma arabicum* Boiss. (1843), Type as above; *Tephrosia arabica* (Boiss.) Martelli (1888), nom. illeg., non *Tephrosia arabica* Steud. (1841).

Description: Erect perennial herb to 50 cm; stems densely appressed white-pubescent. Leaves imparipinnate with 3–5 leaflets, grey-green; petiole up to 10 mm; stipules linear, pubescent; leaflets 12–35(–45) × 4–10(–13) mm, oblanceolate to oblong-lanceolate, entire, apex acute, apiculate, base obtuse to cuneate, appressed pubescent above, silky sericeous on the lower surface. Flowers lilac to purple-pink, in leaf-opposed pseudo-racemes; bracts ± 4 mm, linear, sericeus. Calyx 9–10 mm, lobes ± 8 mm, linear-lanceolate, densely sericeous. Corolla with standard petal ± 11 mm, pubescent on the dorsal surface; wings ± 8 mm. Pod 11–13 mm, densely pilose, beaked, 1-seeded.

Flowering and fruiting: February to May.

Distribution and habitat: Northern Oman, in dry gravelly and stony wadi beds, and lower slopes of the northern mountains. *Altitude*: 50–400 m. Endemic to the Arabian Peninsula, elsewhere found in Saudi Arabia, UAE, Yemen.

Distribution map & Illustration: 330.

Notes: I have not been able to find the publication where Gillett made the combination *T. nubica* subsp. *arabica*. It is probably just 'in sched.'.

4. **Indigofera** L.
About 700 species, pantropical in distribution.

1. Leaves 1-foliolate
   2. Lateral branches ending in sharp points; pod appressed white-hairy .7. **I. spiniflora**
   2. Lateral branches not ending in sharp points
      3. Leaflets more than 10 mm long
         4. Leaflets glaucous; pod not flattened, deflexed, constricted in between the seeds .....13. **I. oblongifolia**
         4. Leaflets grey-green; pod flattened, not constricted in between the seeds .....1. **I. arabica**
      3. Leaflets less than 10 mm long
         5. Stems normal, leaflets not appearing crowded; leaflets broadly ovate, 5–8 mm long, cordate at base .....3. **I. cordifolia**
         5. Leaflets often appearing crowded with the stems condensed; leaflets obovate, 2–4 mm long, base tapering .....12. **I. nephrocarpa**
1. Leaves with many leaflets
   6. Lateral branches ending in sharp points; younger branches zigzagging

7. Leaflets 7–9; stipules with some dark brown to reddish hairs; pod 10–15 × 1mm .....11. **I. rubromarginata**
7. Leaflets 5–7; stipules not as above; pod 8–10 × ± 3 mm .....10. **I. intricata**
6. Lateral branches not ending in sharp points nor zigzagging
8. Stems white-pilose and glandular with sessile or stalked glands
9. Leaflets 13–15; flowers in long axillary racemes .....5. **I. argentea**
9. Leaflets 7–9; flowers in short racemes .....4. **I. colutea**
8. Stems not glandular
10. Pods linear, 15–20 mm long and up to 3 mm in diameter
11. Leaflets broadly ovate to rotund (10–32 × 8–25 mm), glaucous .....9. **I. coerulea**
11. Leaflets not as above
12. Leaflets 5–7, broadly oblong to ovate (20–35 × 12–18 mm) .....8. **I. trita** var. **mafei**
12. Leaflets 3–5, oblong to obovate (6–15 × 4–10 mm) ....15. **I. volkensii**
10. Pods not linear, more than 3 mm in diameter
13. Leaves purple-green; pod somewhat constricted in between the seeds ....6. **I. articulata**
13. Leaves green
14. Plant white-strigose; pod 12–15 mm long, transverse ridges of septa visible .....2. **I. hochstetteri**
14. Plant white-pubescent; pod less than 12 mm long, transverse of septa not visible
15. Leaflets 7–15×4–5mm, appressed white-hairy; pod 2–5-seeded .....1. **I. arabica**
15. Leaflets 2–4 × 2–3 mm, ± glabrous; pod 2-seeded .14. **I. semitrijuga**

1. ***Indigofera arabica*** Jaub. & Spach, Illustr. Pl. Or. 5: t. 479 (1856).

Description: Annual herb often with a woody stock or a perennial herb with annual stems, up to 30 cm, ascending to prostrate; the whole plant grey-green, appressed white-hairy. Leaves imparipinnate with 3–5 leaflets, or sometimes 1-foliolate; stipules ± 3 mm; leaflets 7–15 × 4–5 mm, oblong to oblong-lanceolate to obovate or elliptic, entire, obtuse often with a short mucro, base tapering, white-hairy. Flowers red, 3–4 mm, in axillary racemes; bracts linear. Calyx ± 1 mm, acute, densely white-hairy. Corolla with the standard ± 2 mm. Pods flattened, 5–8 × 3–5 mm, 2–5-seeded, grey-green, appressed white-hairy, beaked.

Flowering and fruiting: February to March.

Distribution and habitat: Northern and central Oman, in gravel wadis, amongst stones, in open *Acacia* woodland. *Altitude*: 150–1300 m. Distributed in Pakistan, Sinai. Elsewhere in the Arabian Peninsula found in Saudi Arabia, UAE, Yemen.

Distribution map: 331.

Notes: Plants from UAE and Oman are often 1-foliolate and with the leaflets larger than those from Yemen and Saudi Arabia.

2. ***Indigofera hochstetteri*** Baker in Oliv., Flora Trop. Africa 2: 101 (1871).
Synonyms: *Indigofera ornithopodioides* Jaub. & Spach (1856), nom. illegit.

Description: Annual herb often with a woody stock; stems up to 30 cm, ± erect to ascending or trailing, appressed white-strigose. Leaves imparipinnate with 3–5 leaflets; stipules linear, ± 5 mm; leaflets 7–20(–22) × 4–8 mm, the terminal leaflet largest, obovate, entire, obtuse or retuse, base tapering, white-hairy to glabrous above, strigose-pubescent beneath. Flowers ± 4 mm long, deep pink or red, in axillary racemes; bracts linear. Calyx ± 2 mm, linear, densely white-hairy. Corolla with the standard ± 2 mm. Pods somewhat flattened, 12–15 × 2–3 m, curved upwards, appressed white-pubescent, beaked, with the transverse ridges of septa visible.

Flowering and fruiting: December to March; September.

Distribution and habitat: Northern and southern Oman, in sandy, rocky places, gravel plains and hillsides. *Altitude*: 10–700 m. Distributed in Egypt. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen. Also found on Soqotra.

Distribution map: 332.

3. ***Indigofera cordifolia*** Heyne ex Roth., Nov. Pl. Sp. 357 (1921).

Description: Annual herb often with a woody stock or perennial herb; stems up to 25 cm, much branched, ± erect to ascending to prostrate, spreading, appressed white-pilose. Leaves 1-foliolate, grey-green, sessile, 5–8 × 4–5 mm, broadly ovate, entire, obtuse or acute, base cordate. Flowers ± 4 mm long, dark red, sessile, 3–4 in the axils of leaves. Calyx ± 4 mm, linear, pilose. Corolla with the standard ± 4 mm, wings ± 3 mm. Pods somewhat flattened, 4–5, appressed white-pilose, long beaked, 2-seeded.

Flowering and fruiting: September to October.

Distribution and habitat: Southern and central Oman, on rocky hill slopes of the escarpment, wadi beds and sandy and stony depressions in the central desert; common annual after rain. *Altitude*: 30–100 m. Distributed in W tropical and NE Africa, Afghanistan to N Australia. Not found elsewhere in the Arabian Peninsula, but found on Soqotra.

Distribution map: 333.

4. ***Indigofera colutea*** (Burm.f.) Merr., Philip J. Sci. 19: 335 (1921).
Basionym: *Galega colutea* Burm.f. (1768).

Description: Perennial herb, up to 25 cm; stems woody, decumbent to ± prostrate, white-pilose and glandular with black or dark brown glands. Leaves imparipinnate with 7–9 leaflets; stipules linear; leaflets 5–9 × ± 5 mm, obovate to broadly elliptic, appressed pilose, apex obtuse with a mucro, base tapering. Flowers red, ± 4 mm, in few-flowered axillary racemes. Calyx ± 2 mm, linear, pilose. Corolla with standard petal ± 3 mm, dark red within, pale without, wings reddish, keel green, ± 2 mm. Pods straight, not flattened, (10–)18–20 × ± 1.5 mm, glandular and appressed pilose, becoming purple tinged when ripe.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, in grassland on the coastal plains and in coastal wadis. *Altitude*: 0–20 m. Distributed from tropical Africa to South Africa, Afghanistan, Indonesia, Australia and New Zealand. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map & Illustration: 334.

5. ***Indigofera argentea*** Burm.f., Fl. Ind. 171 (1768), non Linn. (1771).
Synonyms: *Indigofera semitrijuga* auct. non Forssk. (1775); *I. burmanii* Boiss. (1872).

Description: Perennial herb, up to 40 cm; stems woody, often with herbaceous annual stems, prostrate to ascending, appressed white-pilose and glandular with sessile or shortly stalked glands. Leaves imparipinnate with 13–15 leaflets; stipules ± 2 mm, linear; leaflets 3–5 × 2–2.5 mm, obovate, apex obtuse with a mucro, base tapering, white-hairy. Flowers scarlet red, ± 5 mm, in long axillary racemes. Calyx 1–1.5 mm, linear, pilose. Pods straight, not flattened, 10–15 mm, appressed white-hairy and with glandular hairs, brown when ripe.

Flowering and fruiting: February to April.

Distribution and habitat: Northern and Central Oman, Wahiba Sands, and the Al Halaniyah Islands, in sandy areas and gravel wadi beds. *Altitude*: 20–50 m. Distributed from SW Pakistan to Iran, Egypt, Libya, Sudan, Somalia, Ethiopia. Elsewhere in the Arabian Peninsula found in Qatar, Saudi Arabia, UAE, Yemen. Also found on Soqotra.

Distribution map: 335.

Notes: The young shoots are heavily browsed by goats and camels.

6. ***Indigofera articulata*** Gouan, Ill. 49 (1773).
Vernacular names: ʻuzlim.

Description: Perennial undershrub, to 50 cm; stems grey-white, erect to ascending, spreading, appressed white-hairy. Leaves imparipinnate with 3–7 leaflets, purple-green; stipules small, linear, falling soon; leaflets 5–15 × 5–10 mm, the terminal leaflet the largest, obovate, apex emarginate, base tapering. Flowers pale yellow or greenish, ± 4 mm, in axillary racemes. Calyx 1–2 mm, lobes triangular. Corolla with standard petal pale yellow with red margins. Pods not flattened, attached straight or reflexing downwards, 7–10 × 2–3 mm, slightly curved upwards, densely appressed white-hairy, somewhat constricted in between the seeds, beaked.

Flowering and fruiting: February to March; September to October.

Distribution and habitat: Throughout Oman, including Musandam and Masirah Island, in gravel plains, rocky slopes and coastal plains. *Altitude*: 20–1000 m. Distributed from east tropical Africa westwards to Pakistan and South Asia. Elsewhere in the Arabian Peninsula found in Qatar, Saudi Arabia, UAE, Yemen. Also found on Soqotra.

Distribution map: 336.

Notes: Distinct in its purple-green leaves and pods which appear segmented; grazed by all livestock. Wild-collected seed of this species is held by the Millennium Seed Bank, Royal Botanic Gardens, Wakehurst Place, UK.

7. ***Indigofera spiniflora*** Hochst. & Steud. ex Boiss., Fl. Orient. 2: 190 (1872).

Description: Perennial undershrub, to 50 cm; stems woody, grey-green, erect to ascending, lateral branches ending in sharp points; the whole appressed white-hairy. Leaves imparipinnate, 1–foliolate; stipules minute; leaflet 4–14 × 2–6 mm, grey-green or purplish green, oblong to oblong-ovate, apex obtuse to rounded and emarginate, base tapering. Flowers orange-red, ± 4 mm, axillary on lateral stems. Calyx ± 3 mm, lobes acuminate. Corolla with standard petal ± 5 mm. Pods not flattened, often reflexing downwards, 9–11 × ± 2 mm, beaked, appressed white-hairy, browny white when mature.

Flowering and fruiting: January to September.

Distribution and habitat: Southern Oman, Dhofar, coastal plains and rocky coastal areas. *Altitude*: 20–200 m. Distributed in NE Africa (Ethiopia, Somalia, Sudan). Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen. Also found on Soqotra.

Distribution map: 337.

Notes: The name of this species is based on a specimen collected from Saudi Arabia, Hejaz, near Jeddah (Feb. 1836) by Schimper 945 (holotype, ? , isotype MO).

8. ***Indigofera trita*** L. f., Suppl. Pl.: 335 (1782)
var. ***maffei*** (Chiov.) Ali, Bot. Not. 111: 559 (1958).

Description: Annual or perennial herb, up to 50 cm; stems erect to straggling, ribbed with the ribs pale green, glabrous to sparsely appressed white-hairy, yellow-green. Leaves imparipinnate with 5–7 leaflets; stipules linear; leaflets 20–35 × 12–18 mm, broadly oblong to ovate, apex obtuse with a short mucro, base tapering, glabrous above, appressed hairy beneath. Flowers red, ± 7 mm, in axillary racemes. Calyx 2–2.5 mm, lobes acuminate. Corolla with standard petal ± 7 mm; wings and keel ± 5 mm. Pods not flattened, reflexing downwards, 30–55 × ± 1 mm, linear, appressed white-hairy.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, on the escarpment mountains, in *Anogeissus* woodland. *Altitude*: 400–1000 m. Distributed in NE and E Africa (Ethiopia, Somalia, Sudan, Kenya, Tanzania, Mozambique), Pakistan. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map: 338.

Notes: Several infraspecific taxa are recognised based on pubescence. Oman plants are referable to the above variety.

9. ***Indigofera coerulea*** Roxb., Fl. Ind. ed. Carey, 3: 377 (1832)
var. ***coerulea***
(Incl. *I. coerulea* var. *occidentalis* Gillett & Ali (1958).
Vernacular names: ʿuzlim; ḥor, ḥober, ḥowr (Jibbālī); ḥewīr (Ẓufari Arabic).

Description: Perennial bushy shrub, to 50 cm; stems erect to ascending, spreading, whitish green, densely covered with appressed white hairs. Leaves imparipinnate, glaucous, with 3–5 pairs of leaflets; stipules minute, falling soon; leaflets 10–32 × 8–25 mm, broadly ovate to rotund, apex obtuse to rounded with a small mucro, base tapering, glabrous above, pubescent below or pubescent on both surfaces. Flowers red to pink, ± 4 mm, in axillary racemes. Calyx ± 1 mm, lobes triangular. Corolla with standard petal 2–3 mm. Pods not flattened, reflexing downwards, 15–20 × ± 3 mm, curved upwards, beaked, dark brown with white appressed hairs, 1–3-seeded.

Flowering and fruiting: February to April; August to October.

Distribution and habitat: Throughout Oman, in wadis, coastal plains and in woodlands. *Altitude*: 30–750 m. Distributed in E Africa, Ethiopia, Somalia, Sudan, Mauritius. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen. Also found on Soqotra.

Distribution map & Illustration: 339.

Notes: *Indigofera caerulea* var. *occidentalis* Gillett & Ali (Kew Bull. Add. Ser. 1: 102 (1958)) is recognised by its leaflets pubescent on both surfaces, but the difference between the two is not always consistent (in Oman plants) to justify an independent rank. Wild-collected seed of this species is held by the Millennium Seed Bank, Royal Botanic Gardens, Wakehurst Place, UK.

10. ***Indigofera intricata*** Boiss., Fl. Or. 2: 190 (1972).
Vernacular names: gaţaiţi, itherīr, qefeyti, seberqeyt.

Description: Perennial herb or undershrub, to 40 cm; stems woody, grey-green, somewhat zigzag, prostrate to ascending, stems ending in sharp tips, appressed white-pubescent. Leaves imparipinnate with 5–7 leaflets; stipules minute, falling soon; leaflets 3–5 × 2–4 mm, obovate, apex obtuse to truncate, base tapering, appressed pubescent on both surfaces. Flowers scarlet red, 2–3 mm, in short axillary racemes. Pods not flattened, 8–10 × ± 3 mm, grey-green to brownish, 2–4-seeded.

Flowering and fruiting: February to April.

Distribution and habitat: Northern and Central Oman, Masirah Island, in sandy and gravel plains, gravel wadi beds and wadi banks. *Altitude*: 30–550 m. Distributed in Iran, SW Pakistan. Elsewhere in the Arabian Peninsula found in Qatar, Saudi Arabia, UAE, Yemen.

Distribution map & Illustration: 340.

Notes: Young shoots are browsed by livestock.

11. ***Indigofera rubromarginata*** Thulin, Nord. J. Bot. 15(5): 519–521 (1995).

Description: Perennial woody-based herb; stems prostrate, to 40 cm, appressed white-pubescent; older stems brownish white, younger stems whitish, distinctly zigzag. Leaves imparipinnate with 7–9 leaflets; stipules ± 1 mm, narrow linear with some dark brown to reddish hairs; leaflets 2–5 × 1–2 mm, oblong to obovate, apex obtuse or with a short mucro, truncate, base tapering, appressed pubescent on both surfaces. Flowers red, ± 4 mm, in short few-flowered axillary racemes. Calyx ± 2 mm, lobes triangular. Pods not flattened, 10–15 × ± 1 mm, ± beaked, brownish white, 3–6-seeded.

Flowering and fruiting: September to February.

Distribution and habitat: Southern Oman and Islands, including Al Halaniyah and Masirah, in rocky and stony coastal wadis and plains, and coastal dunes. *Altitude*: 0–70 m. Distributed in the coastal parts of southern Yemen and Oman, where it is endemic.

Distribution map: 341.

Notes: The name of this species is based on a specimen collected from Yemen (Hadhramaut, Mukalla), by Thulin, Eriksson, Langstrom & Al Gifri 8191 (holotype UPS, isotypes K).

12. ***Indigofera nephrocarpa*** Balf. f., Proc. Roy. Soc. Edinb. 6(11): 509 (1882).

Description: Perennial undershrub; stems prostrate to ascending, greyish brown, older stems and branches whitish green, the whole plant appressed white-pubescent. Leaves 1–foliolate, glaucous; stipules with some dark brown hairs; leaflets 2–4 × 1.5–2 mm, obovate, apex obtuse, base tapering, often the stems condensed and leaves appearing very crowded. Flowers scarlet red, ± 2 mm. Pods not flattened, ± 5 mm, greyish brown.

Flowering and fruiting: February to April.

Distribution and habitat: Southern and Central Oman, and offshore on Al Halaniyah, in open desert, sandy depressions, gravelly places and rocky coastal areas; uncommon. *Altitude*: 0–250 m. Distributed in NE Somalia, Pakistan. Elsewhere in the Arabian Peninsula found in Yemen (Al Mahra). Also found on Soqotra.

Distribution map & Illustration: 342.

13. ***Indigofera oblongifolia*** Forssk., Fl. Aegypt.-Arab.: 137 (1775).
Vernacular names: ḥashit, aṣḥah, ḥashyit (Jibbālī).

Description: Shrub, to 1m, branched; stems and branches brown, younger stems whitish green, appressed white hairy. Leaves 1–foliolate, glaucous; stipules triangular with brown margins; leaflets 10–15 × 4–6 mm, obovate, entire, apex obtuse to acute, with a small mucro, base tapering, pubescent on both surfaces. Flowers red, ± 4 mm, in axillary racemes, deflexed after maturation. Calyx lobes triangular. Pods not flattened, reflexing downwards, 15–20 mm, curved upwards, beaked, dark brown with white appressed hairs, 7–9-seeded, constricted in between the seeds.

Flowering and fruiting: February to March; September to October.

Distribution and habitat: Throughout Oman, in wadis, coastal plains and in woodlands. *Altitude*: 10–700 m. Distributed from W and N Africa eastwards through Arabia to India and Sri Lanka. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen. Also found on Soqotra.

Distribution map & Illustration: 343.

Notes: The name of this species is based on a specimen collected from Yemen (Al Luhayyah) by P. Forsskål (no specimen found, see Hepper & Friis, 1994). Wild-collected seed of this species is held by the Millennium Seed Bank, Royal Botanic Gardens, Wakehurst Place, UK.

14. ***Indigofera semitrijuga*** Forssk., Fl. Aegypt.-Arab.: 137 (1775).

Description: Prostrate perennial, almost forming mats; stems up to 20 cm, older stems brownish, younger grey-green, appressed white-hairy. Leaves imparipinnate with 5 leaflets; stipules linear; leaflets 2–4 × 2–3 mm, obovate, entire, apex truncate to emarginate, base tapering, pubescent on both surfaces, young leaves yellow-green. Flowers scarlet red, ± 2 mm, in axillary racemes, deflexed after maturation. Pods not flattened, reflexing downwards, 4–6, beaked, whitish brown, 2-seeded.

Flowering and fruiting: September to October.

Distribution and habitat: Southern and Central Oman, in sandy and gravel wadis, and sandy depressions in gravel plains. *Altitude*: 0–250 m. Distributed in N Ethiopia. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map: 344.

Notes: The name of this species is based on a specimen collected from Yemen (Al Luhayyah) by P. Forsskål, 1354 (BM, C).

15. ***Indigofera volkensii*** Taub., Pflanzenw. Ost-Afrikas C: 210 (1895).
Synonyms: *Indigofera phillipsiae* Bak.f. (1903); *I. insularis* Chiov. (1908).

Description: Low perennial to almost prostrate subshrub, branched; stems and branches arising from a basal woody stock, up to 20 cm; older stems brownish white, younger grey-green to white, densely appressed white-hairy. Leaves imparipinnate with 3–5 leaflets; stipules linear, brown; leaflets 6–15 × 4–10 mm, oblong to obovate, entire, apex acute to obtuse, base tapering, ± glabrous to hairy on the upper surface, hairy beneath. Flowers reddish purple, ± 5 mm, in axillary racemes, shortly pedicellate, deflexed after maturation. Calyx ± 4 mm, lobes linear. Pods not flattened, reflexing downwards, 18–20 × 1–2 mm, very narrow, beaked, brown.

Flowering and fruiting: August to October.

Distribution and habitat: Southern Oman, on the escarpment mountains, on the slopes and summit plateau with *Euphorbia balsamifera* and *Commiphora* spp. *Altitude*: 50–1500 m. Distributed in NE and tropical E Africa (Ethiopia, Sudan, Uganda, Kenya, Tanzania). Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map: 345.

Cultivated species

Indigofera tinctoria L. (1753).
Vernacular names: nīl.
Shrubby herb with 9–13 leaflets and a straight or slightly curved pod up to 30 mm long.
Nīl has long been cultivated in Northern and Southern Oman since a long time as a dye plant; it can be found as an escape near habitation. The practice of dyeing with nīl is largely discontinued, although in Dhofar during certain festivals such as Eīd (celebration after the month of fasting) Dhofari men dress in the traditional indigo blue cloth for traditional celebration ceremonies.

5. **Sesbania** Scop. (nomen conserv.)
55 species widely distributed in the tropics and subtropics of the world.

1. Flowers with appendages of standard petal free at the tips . . . . . .1. **S. sesban**
1. Flowers with appendages of standard petal adnate to the claw
   2. Plant glabrous to glabrescent; stems aculeate (prickly) . . . . . .2. **S. bispinosa**
   2. Plant pubescent throughout except the flower and fruit; stems not aculeate . . . . . .3. **S. sericea**

1. ***Sesbania sesban*** (L.) Merr., Philipp J. Sci. (Bot.) 7: 235 (1912).
Basionym: *Aeschynomene sesban* L. (1853).

Description: Small tree or shrub, short-lived; stems soft, woody, up to 3 m, glabrous or glabrescent, pale green. Leaves paripinnate with ± 12 pairs of leaflets; rachis 4–14 cm; leaflets 10–20 × 3–4 mm, oblong, obtuse with a small mucro, glabrous; stipules ± 5 mm, narrow triangular. Bracts and bracteoles falling soon. Flowers in axillary racemes; pedicels up to 12 mm, slender. Calyx 4–5 mm, lobes 0.5–1 mm, triangular, acute. Corolla with standard petal yellow within, pale yellow with violet to purple flecks without, 12–15 × ± 18 mm, appendages with free tips, not adnate to the claw; wings yellow; keel pale green to white. Pod up to 20 cm, erect, straight, with a beak ± 4 mm, slightly torulose.

Flowering and fruiting: May; October to December.

Distribution and habitat: Southern Oman, Dhofar, in moist and marshy places on the plains, and at edges of permanent pools; also planted and naturalized especially in Northern Oman where it is found near edges of agricultural farms. *Altitude*: 5–250 m. Distributed in the Old

World tropics; introduced elsewhere. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map: 346.

2. ***Sesbania bispinosa*** (Jacq.) Wight in US Dept. Bur. Pl. Ind. Bull. No. 137: 15 (1909).
Basionym: *Aeschynomene bispinosa* Jacq. (1792).

Description: Small tree or shrub, up to 3 m; stems glabrous or glabrescent, sparsely aculeate. Leaves paripinnate with ± 20 pairs of leaflets; stipules ± 5 mm, linear-lanceolate, falling soon; rachis up to 30 cm, aculeate on the lower side; leaflets 10–20 × 3–4 mm, oblong, obtuse glabrous to sparsely pilose when young, glabrous when old. Flowers in axillary racemes; pedicels up to 10 mm, slender. Calyx 4–4.5 mm, lobes 0.5–1 mm, triangular, acute, ± pubescent on the margins. Corolla with standard petal yellow with purple to blackish flecks, 10–11 × ± 10 mm, appendages adnate to the claw; wings yellow; keel pale green to white. Pod 15–18 cm, with beak ± 6 mm, curved, pendulous, slightly torulose.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, in moist wadis beds and edges of pools. *Altitude*: 10–500 m. Distributed in tropical Africa, Madagascar, SW and SE Asia, Sri Lanka, West Indies and northern South America (probably introduced). Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map: 347.

3. ***Sesbania sericea*** (Willd.) Link, Enur. Hort. Berol. Alt. 2: 244 (1822).
Basionym: *Coronilla sericea* Willd. (1809).

Description: Annual or short-lived perennial, up to 2 m; stems pubescent throughout. Leaves paripinnate with ± 20 pairs of leaflets; stipules ± 5 mm, lanceolate, falling soon; rachis up to 15 cm, pubescent; leaflets 15–30 × 5–6 mm, oblong, obtuse, glabrous above pubescent beneath. Flowers in axillary racemes. Calyx 3–4 mm, lobes ± 1 mm, triangular, acute, ± pubescent on the margins. Corolla with standard petal yellow with dark purple flecks, ± 10 mm, appendages narrow, adnate to the claw; wings yellow; keel ?pale green to white. Pod ?± 12 cm, with beak ± 5 mm, curved, pendulous, slightly torulose (mature pod not seen).

Flowering and fruiting: ?September to October.

Distribution and habitat: Southern Oman, Dhofar; known from a single collection collected by Th. Bent in 1895 from the Dhofar mountains, Hafa Coast, and not collected since. *S. sericea* is also not recorded from the coastal hills in SE Yemen that neighour the Dhofar mountains. The plant is unmistakeably *S. sericea*, and being quite a distictive plant it is either no longer present in Dhofar or the collection is wrongly labelled. Distributed in tropical Africa, Sri Lanka, West Indies and South America (probably introduced). Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map: 348.

Cultivated species

Sesbania grandiflora (L.) Poir. in Lam. (1806).

Tree up to 10 m tall, with soft wood; leaflets 30–60, 15–25 × 5–10 mm, oblong, obtuse, glabrous. Flowers white or red, 5–10 cm, large and showy. Pod 30–50 cm long with thick sutures. Cultivated in the Capital area in private gardens and along avenues, but not commonly so.

6. **Ormocarpum** Beauv. (nomen conserv.)
About 30 species distributed in the Old World tropics.

Ormocarpum dhofarense Hillcoat & Gillett, Kew Bull. 20: 337 (1966).
Type: Oman, Dhofar, Jebel Qara, 1 Oct. 1943, Vesey FitzGerald 12360/2 (BM).
Vernacular names: khēmer (Ẓufari Arabic), khīr (Jibbālī).

Description: Perennial shrub or small tree, up to 2 m, with prominent tubercles (formed from hair bases) on the trunk and branches, ± glabrous. Leaves imparipinnate, with 9–11 leaflets; stipules linear to triangular; leaflets 3–15 × 1–8 mm, elliptic to oblong, entire, acute, glabrous or thinly pubescent on the margins, midrib purplish or yellowish beneath. Flowers yellow-red in 3–10-flowered axillary racemes; pedicel 10–17 mm. Calyx ± 6 mm, campanulate, lobed to half the length of the tube; lobes unequal, ciliate. Corolla with standard petal 10–13 mm; keel curving upwards. Pod flattened, 10–18 × 9–10 mm, constricted in between the 1–2 seeds, stipitate, olive-brown, prominently veined, indehiscent.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, on the wet escarpment mountains and extending to some drier wadis to the north of the summit areas, with *Anogeissus dhofarica* and *Commiphora* spp. *Altitude*: 300–1200 m. Regionally endemic, also found in SE Yemen.

Distribution map & Illustration: 349.

Notes: Browsed by all livestock.

7. **Alhagi** Adans.
3 species distributed from eastern Mediterranean east to Mongolia, W China and India and Pakistan, south to Sudan and Chad.

Alhagi graecorum Boiss., Diagn. Pl. Or. Nov. Ser, 1, 9: 114 (1848); Fl. Orient. 2: 559 (1872).
Synonyms: *A. maurorum* (non Medik.) DC. (1825); *A. maurorum* var. *karduchorum* Boiss. (1872); Boiss. (1872); Rech. f. (1950).
Vernacular names: agul, aqul.

Description: Subshrub, up to 2 m. Stems erect to ascending, lateral branches becoming spinescent, glabrous to pubescent. Leaves 10–20 × 3–8 mm, obovate to oblong-elliptic, apex apiculate, obtuse or emarginate, base rounded, margins entire glabrous or pubescent; petiole ± 2 mm. Flowers red or purplish-red, in lax axillary racemes; bracts ± 1 mm, persistent; sepals 2–2.5 mm, teeth minute, glabrous. Petals 6–8 mm; stamens 9+1. Pod 10–30 × 2–3 mm, linear, constricted irregularly in between the seeds, glabrous, 1–9-seeded.

Flowering and fruiting: April to June.

Distribution and habitat: Throughout northern Oman, in sandy, saline and damp soils, frequently as a weed of cultivation, in abandoned fields and disturbed places on the Batinah coastal farms. *Altitude*: 20–50 m. Distributed in the eastern Mediterranean region, Egypt, and eastwards to Iran. Elsewhere in the Arabian Peninsula found in Bahrain, Qatar, Saudi Arabia, UAE, Yemen.

Distribution map & Illustration: 350.

Notes: The whole plant has been used in traditional medicine for treating cataracts, jaundice, migraine and painful joints.

8. **Ebenus** L.
18 species distributed from east Mediterranean to Baluchistan.

Ebenus stellata Boiss., Diagn. Ser. 1, 2: 100 (1843).
Vernacular names: jardan kalbān, jardu, kum'il.

Description: Perennial cushion-forming shrub, to 75 cm; young stems grey-white, pubescent. Leaves (1–)3(–5)-foliolate, 15–25 × 1–1.5 mm, linear-lanceolate, apex ending in a spine, glaucous; stipules spine-tipped, densely pubescent. Flowers orange to red-yellow, surrounded by bracts; bracts leaf-like, 10–12 mm, pilose, spine-tipped. Calyx linear-lanceolate, pilose. Corolla with standard petal 5–6 mm, orange with red lines, wings yellow-orange, keel pale yellow. Pod 9–10 mm, 1-seeded.

Flowering and fruiting: March to May.

Distribution and habitat: Northern Oman, on the western and eastern Hajar mountains, on the summit plateau, mountain slopes amongst rocks, in the *Juniperus–Olea–Sideroxylon* woodland; common. *Altitude*: 1600–3000 m. Distributed in Iran, Afghanistan, SW Pakistan (Baluchistan). Not found elsewhere on the Arabian Peninsula.

Distribution map & Illustration: 351.

Notes: A spectacular shrub when in flower with orange/red flowers. Not browsed by goats.

9. **Desmodium** Desv.
About 300 species distributed throughout tropical and subtropical regions, and into temperate regions north to S Canada.

1. Annual herbs; pod segments with thickened margins, reticulately veined, ciliate ....1. **D. ospriostreblum**
1. Perennial herbs; pod segments without thickened margins
   2. Leaves 1–3-foliolate .....2. **D. dichotomum**
   2. Leaves 1-foliolate .....3. **D. gangeticum**

1. ***Desmodium ospriostreblum*** Steud. ex A.Rich., Tent. Fl. Abyss. 1: 204 (1847).

Description: Annual herb, up to 40 cm; stems branched, hispid-pubescent, often reddish. Leaves 1–3-foliolate, 10–40 × 6–24 mm, the terminal leaflet largest, ovate to ovate-lanceolate, acute to obtuse, rounded to truncate at base, hispid and ciliate. Flowers in axillary racemes. Calyx 2–3 mm, linear. Corolla with standard petal and wings pale pink, keel pink, magenta distally. Pod with 3–5(–7) segments, flattened with margins thickened, yellow-green with reddish margins, pubescent and ciliate, reticulately veined, dark brown when mature.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, on the escarpment woodlands, in wadis, in *Anogeissus–Delonix* woodland. *Altitude*: 10–100 m. Distributed in western and southern tropical Africa. Elsewhere in the Arabian Peninsula found in Yemen.

Distribution map: 352.

Notes: Uncommon. Like several annual species in the Dhofar region, especially on the escarpment woodlands, this species has not been collected since the late 1970s. It is one of the palat-

able species which is browsed as soon as seedlings appear by the growing livestock holdings. It is placed as Data Deficient on the National Red List.

2. ***Desmodium dichotomum*** (Klein ex Willd.) DC., Prodr. Syst. Nat. Reg. Veget. 2: 336 (1825).
Basionym: Hedysarum dichotomum Willd. (1802).

Description: Perennial herb, up to 35 cm; stems ± woody, decumbent, hispid-pubescent. Leaves 1–3- foliolate; leaflets 22–70 × 18–37 mm, ovate to ovate-lanceolate, obtuse with the midrib extending to form a short mucro, base truncate; stipules ± 3 mm, linear. Bracts linear. Flowers purple-mauve, in long racemes. Calyx 2–3 mm, sparsely pilose, persistent. Corolla with standard petal ± 3 mm, obovate. Pod 11–15 mm, segments 5–6, pubescent, beaked, yellow-green.

Flowering and fruiting: September.

Distribution and habitat: Southern Oman, Dhofar, in the escarpment woodlands, in damp locations. *Altitude*: 0–10 m. Distributed in Sudan, Uganda, also in India to China and Malaysia. Not recorded elsewhere in the Arabian Peninsula.

Distribution map: 353.

Species expected to occur in Oman.

3. ***Desmodium gangeticum*** (L.) DC., Prodr. 2: 327 (1825).

Description: Herbaceous to woody perennial, up to 50 cm; stems minutely pubescent. Leaves 1-foliolate, 20–70 × 8–42 mm, ovate to ovate-lanceolate, obtuse to acute, base truncate; stipules linear. Flowers in racemes. Calyx 1–2 mm, pubescent, persistent. Corolla with standard petal red to purple, 3–4 mm; wings reddish. Pod 20–25 mm, with 7–9 articles, beaked, flattened, pubescent.

Flowering and fruiting: September.

Distribution and habitat: Expected to occur in southern Oman, Dhofar, in escarpment woodland, in damp locations. Distributed throughout the Old World tropics.

Notes: Plants from Oman so far identified as *D. gangeticum* are referable to *D. dichotomum*.

10. **Alysicarpus** Desv.
About 30 species distributed and widely naturalized from Senegal to Somalia and Arabia south to South Africa, Madagascar and Mascarenes; Afghanistan and Himalaya to China and Australia.

1. Pods distinctly constricted in between the segments
   2. Calyx lobes scarcely overlapping at the base . . . . . .1. **A. glumaceus**
   2. Calyx lobes overlapping at the base . . . . . .2. **A. rugosus**
1. Pods not constricted in between the segments
   3. Leaves oblong to suborbicular to oblong-lanceolate; inflorescence lax; pod well exserted from the calyx . . . . . .3. **A. vaginalis**
   3. Leaves oblong; inflorescence dense; pod scarcely exserted from the calyx . . . . . .4. **A. longifolius**

1. ***Alysicarpus glumaceus*** (Vahl) DC., Prodr. 2: 353 (1825).
Basionym: *Hedysarum glumaceum* Vahl (1791).

Description: Annual herbs; stems erect to ascending, up to 75 cm, pubescent to pilose. Leaves 1-foliolate, leaflets 6.5–12.5 × 0.2–1.5 cm, oblong to linear-lanceolate, apex acute, mucronulate, base subcordate, pubescent, pilose beneath; stipules 3–4 mm, scarious. Flowers dull purple or orangy, in lax terminal or leaf-apposed racemes; sepals 5–7 mm, scarious, upper 2 lobes united, pilose, ciliate, lobes scarcely overlapping at the base; corolla about as long as the calyx. Pods 5–15 mm, linear-oblong, pubescent, transversely ridged, distinctly constricted in between the articles, exserted from the calyx; young pods bright green.

Flowering and Fruiting: March to April; September.

Distribution: Southern Oman, Dhofar, on the escarpment mountains and coastal plains, in grassland, beside water in damp and shaded locations. *Altitude*: 0–400 m. Distributed throughout tropical and NE Africa. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map: 354.

Notes: This taxon is recognized as subsp. *glumaceus* var. *glumaceus* in Flora of Tropical East Africa. The name of this species is based on a specimen collected from Yemen, Surdud, by P. Forsskål (holotype C).

2. ***Alysicarpus rugosus*** (Willd.) DC., Prodr. 2: 353 (1825)
subsp. ***rugosus***
Basionym: *Hedysarum rugosum* Willd., Sp. Pl. 3(2): 1172 (1802).

Description: Annual herbs; stems ascending to trailing or creeping, up to 20 cm, glabrous to sparsely pubescent. Leaves 1-foliolate, 7–20 × 4–10 mm, oblong, apex obtuse to emarginate, base subcordate to truncate, glabrous above, sparsely pilose beneath, dark-green; petiole ± 5 mm; stipules ± 4 mm, scarious. Flowers pinkish or purple, in dense, congested, almost capitate, axillary and terminal racemes; bracts ± 6 mm, scarious. Calyx 7–8 mm, pale green, becoming scarious, lobes overlapping at the base, pubescent, white-ciliate; corolla about as long as the calyx. Pod 5–8 mm, linear-oblong, constricted in between the segments, transversely ridged, puberulous, scarcely exserted from the calyx, indehiscent.

Flowering and fruiting: March.

Distribution and habitat: Northern Oman, as a weed of waste places. *Altitude*: ± 600 m. Distributed in E, NE and SW tropical Africa, and Madagascar. Not recorded elsewhere in the Arabian Peninsula.

Distribution map: 355.

Notes: Known only from a single collection on an agricultural farm in Nizwa, and not collected since; probably introduced as a weed of agriculture.

3. ***Alysicarpus vaginalis*** (L.) DC., Prodr. 2: (1825).
Basionym: *Hedysarum vaginale* L. (1753).

Description: Annual or perennial herbs, woody at the base; roots with nodules; stems erect to ascending or creeping, up to 25 cm, glabrous to sparsely pubescent. Leaves 1-foliolate, 8–25 × 5–14 mm, oblong to suborbicular to oblong-lanceolate, apex obtuse, base subcordate;

petiole 5–10 mm, leaves glabrous above, sparsely pilose beneath; stipules 4–5 mm, scarious. Flowers orange or purple or greenish with dark pink to purple streaks, in dense racemes. Calyx 5–6 mm, lobes not overlapping at the base. Corolla about as long as the calyx. Pod 12–20 × ± 2 mm, linear-oblong with straight margins, obscurely or not constricted in between the segments, reticulately ridged, puberulous, well exserted from the calyx, indehiscent.

Flowering and fruiting: September.

Distribution and habitat: Southern Oman, Dhofar, in the escarpment woodlands, in wadi beds, amongst grass, beside water in mud, and in damp and shaded locations; not recorded from Northern Oman, but perhaps overlooked. *Altitude*: 0–400 m. Distributed in tropical Africa and tropical Asia. Elsewhere in the Arabian Peninsula found in ?Saudi Arabia, Yemen. Also found on Soqotra.

Distribution map: 356.

4. ***Alysicarpus longifolius*** (Rottl. ex Spreng.) Wight & Arnott, Prodr. Pen. Ind. Or.: 233 (1834).
Basionym: *Hedysarum logifolium* Rottl. (1826).

Description: Annual herb, up to 1 m; stems erect, somewhat ribbed, glabrous. Leaves 1-foliolate, yellow-green above, grey-green below; leaflets 1–7(–10) × 0.9–2.5 cm, oblong to lanceolate, acute to obtuse, base subcordate, glabrous above, appressed pubescent on the nerves beneath; stipules 5–6 mm, scarious. Flowers purple, in dense terminal racemes, 10–30 cm long; bracts ± 13 mm, ovate, acuminate, woolly pubescent, falling soon; sepals 10–16 mm, upper 2 lobes united, pubescent; corolla about as long as the calyx. Pods 9–13 mm, linear-oblong with straight sides, scarcely exceeding from the calyx, pubescent, reticulately veined, indehiscent.

Flowering and fruiting: September.

Distribution and habitat: Southern Oman, Dhofar, in wadis, in damp ground; ± weedy. *Altitude*: sea level. Distributed in SW Asia. Elsewhere in the Arabian Peninsula found in Saudi Arabia, ?UAE, Yemen.

Distribution map: 357.

11. **Teramnus** P.Browne
About 8 species, pantropical in distribution.

Teramnus repens (Taub.) Bak.f., J. Bot. 66, suppl. 1: 115 (1928)
subsp. ***gracilis*** (Chiov.) Verdc., Kew Bull., 24: 275 (1970).
Basionym: *Teramnus gracilis* Chiov. (1908).
Vernacular names: sadayd, dujur aghereb (Jibbālī).

Description: Annual herb; stems weak, prostrate, creeping, trailing or twining, patent-villous. Leaves 3-foliolate, green; petiole up to 30 mm; stipules and stipels present; leaflets 18–45 × 14–28 mm, obovate to broadly elliptic, entire, apex obtuse to rounded, ± apiculate, base acute to truncate, villous or glabrescent. Flowers white to pale pink to mauve, ± 4 mm, in small axillary racemes; peduncle up to 10 mm, slender; pedicel 2–4 mm, filiform. Calyx ± 2 mm, lobes acute, the upper 2 joined, villous with spreading hairs. Stamens with 5 normal anthers alternating with 5 small and sterile anthers. Pod 28–30 mm, flattened, linear, curved, beaked, vil-

lous with ± spreading hairs, with prominent transverse indentations, valves ± twisting on dehiscence.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, on the lower slopes of the escarpment mountains, and grassy plains. *Altitude*: 100–500 m. Distributed in tropical E and C Africa (Kenya, Uganda, Tanzania, Congo) Sudan, India. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen. Also found on Soqotra.

Distribution map: 358.

Notes: The name of this species is based on a specimen collected from Yemen by P. Forsskål s.n., (holotype LD, K photo).

12. **Vatovaea** Chiov.
Monotypic, distributed in Arabia, Ethiopia and Somalia to Tanzania.

Vatovaea pseudolablab (Harms) Gillett, Kew Bull. 20: 104, 1/a (1966).
Basionym: *Vigna pseudolablab* Harms (1913).
Vernacular names: zer'am, zer'm (Jibbāli, Ẓufari Arabic).

Description: Climbing perennial herb, up to 1(–2) m, woody below; stem arising from a large tuber, branched, sparsely pubescent. Leaves 3-foliolate; petiole up to 4 cm; stipules ± 3.5 mm, oblong; stipels minute; leaflets up to 6 × 5.5 mm, ovate to ovate-rhomboid, apex rounded to acute, base oblique, sparsely appressed pubescent to glabrous. Flowers pale green to pink to pink-purple, twisted, in erect, axillary racemes up to 30 cm long; pedicels ± 2 mm. Calyx 2.5–3 mm, lobes ± 2.5 mm, upper two joined, ± emarginate, lower 3 rounded to ovate. Corolla with standard petal rotund, 18–20 mm long and broad, emarginate with 2 stiff appendages at base; keel pale green, resupinate. Stamens 9 joined and vexillary stamen free. Style curved, hairy inside towards the apex, with a small reflexed appendage at the apex. Pod flattened, 6–7 × 1–1.5 mm, linear-oblong, curving upwards, silky pubescent, glabrescent, valves twisting after dehiscence.

Flowering and fruiting: August to September.

Distribution and habitat: Southern Oman, Dhofar, in the lower altitudes of the escarpment woodlands, in the gulleys in the plains and wadis, with *Acacia* and *Commiphora*. *Altitude*: 50–150 m. Distributed in Uganda, northern Kenya, Tanzania, Sudan, Somalia and Ethiopia. Elsewhere in the Arabian Peninsula found in Yemen (Al Mahra).

Distribution map & Illustration: 359.

13. **Vigna** Savi (nomen. conserv.)
150 species distributed throughout the tropical and warm temperate regions; widely cultivated.

Vigna radiata (L.) Wilczek, Fl. Congo Belge 6: 386 (1954)
subsp. ***sublobata*** (Roxb.) Verdc., Kew Bull. 24: 559 (1970).
Synonyms: *Phaseolus sublobatus* Roxb. (1832).

Description: Annual herb; stems climbing to ascending, up to 50 cm, brown pubescent with patent hairs. Leaves 3-foliolate; petiole up to 20 cm; stipules up to 15 mm, peltate; leaflets

3–15 × 2–10 cm, ovate to broadly elliptic to rhomboid, 2–3-lobed, apex obtuse to acute, base acute to oblique. Flowers yellow to greenish yellow, in many-flowered axillary racemes. Calyx 5-lobed, 2-lipped, the upper lip 2-lobed, ± united, lower lip 3-lobed. Stamens 9 united, vexillary stamen free. Pod linear-oblong, 30–70(–90), beaked, pubescent.

Flowering and fruiting: September.

Distribution and habitat: Southern Oman, on the plateau grassland; possibly an escape from cultivation. *Altitude*: ± 600 m. Distributed in the tropical Asia and Africa; often cultivated.

Distribution map & Illustration: 360.

14. **Rhynchosia** Lour. (nomen. conserv.)
About 200 species distributed in the tropics and subtropics.

1. Leaflets generally large, up to 70 mm long and broad, glabrous above . .3. **R. minima**
1. Leaflets up to 15 mm long and broad, pubescent on both surfaces
   2. Plants glandular with orange sessile glands .....2. **R. pulverulenta**
   2. Plants not glandular .....1. **R. schimperi**

1. ***Rhynchosia schimperi*** Boiss., Fl. Or. 2: 626 (1872).
Type: Oman, "in regno Muscate Arabiae", Aucher-Eloy 4359 (syntypes BM, G).

Description: Perennial herb or subshrub; stems branching from the base, ± erect to decumbent, up to 30 cm, glaucous, densely white-pubescent. Leaves 3-foliolate; petiole up to 15 mm; stipules linear, pubescent; leaflets 5–12 ×5–12 mm, rhomboid, truncate to emarginate, base tapering, nerves prominent below, grey-green, densely white-pubescent on both surfaces. Flowers yellow, in 1–2-flowered axillary racemes, ± sessile. Calyx 4–5 mm, 5-lobed to 2/3 the length, lobes unequal, lanceolate, acute, pubescent. Corolla with standard petal pubescent. Stamens 9, united with the vexillary stamen free. Pod 20–25 mm, beaked, pubescent, grey-brown, 2-seeded.

Flowering and fruiting: March.

Distribution and habitat: Southern Oman, coastal wadis, short grassland on the upper slopes of the escarpment mountains, and in mixed *Anogeissus–Allophylus* woodland. *Altitude*: 50–600 m. Distributed from Egypt to Arabia, Pakistan, India. Not found elsewhere in the Arabian Peninsula.

Distribution map: 361.

2. ***Rhynchosia pulverulenta*** Stocks, Kew J. Bot. 4: 147 (1852).
Synonyms: *Rhynchosia memnonia* (Delile) DC. forma *pulverulenta* (Stocks) Terracc. (1893).

Description: Perennial herb; stems trailing to sometimes twining, up to 1.5 m, white-tomentose, glandular. Leaves trifoliolate; petiole up to 3 cm; stipules linear-lanceolate, pubescent; leaflets 7–15 × 7–14 mm, rhomboid, acute, terminal leaflet with rachis 2–4 mm, lateral leaflets ± sessile, grey-green, pubescent on both surfaces, more so on the midrib below, glandular. Flowers yellow, in axillary racemes. Calyx ± 5 mm, 5-lobed to 2/3 the length, lobes unequal, the lowest longest, lanceolate, acute, pubescent. Corolla with standard petal ± 5 mm, pubescent and glandular. Vexillary stamen free. Pod 18–22 mm, slightly curved, beaked, pubescent, glandular, brownish, 2-seeded.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, on the coastal plains and wadis. *Altitude*: 0–10 m. Distributed in tropical Africa, Arabia westwards to India. Elsewhere in the Arabian Peninsula found in Saudi Arabia. Also found on Soqotra.

Distribution map: 362.

3. ***Rhynchosia minima*** (L.) DC., Prodr. 2: 385 (1825).
Basionym: *Dolichos minimus* L. (1753).

Description: Annual herb; stems branched, trailing to climbing, ribbed, up to 2 m, white-pubescent. Leaves 3-foliolate; petiole up to 5 cm; stipules ovate-lanceolate, many-veined, pubescent; leaflets 10–70 × 5–65 mm, broadly ovate to rhomboid, acute, base ± unequal, terminal leaflet with rachis up to 1 cm, lateral leaflets ± sessile; leaflets glabrous above, ± pilose on the margins and midrib below, with conspicuous orange glands. Flowers pale yellow with brownish streaks, in axillary racemes. Calyx 3–4 mm, 5-lobed to 1/2 the length, lobes unequal, lanceolate, acute, pubescent and glandular. Corolla with standard petal ± 5 mm. Vexillary stamen free. Pod 15–20 mm, beaked, pubescent, brownish-green, 2–3-seeded.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar in the grassland and wet woodland, and on the lower seaward facing slopes, trailing over shrubs, rocks and stones. *Altitude*: 100–850 m. Distributed in tropical Africa, Arabia westwards to China; Cape Verde Islands, West Indies and tropical America. Elsewhere in the Arabian Peninsula found in Qatar, Saudi Arabia, Yemen. Also found on Soqotra.

Distribution map: 363.

Notes: *Rhynchosia minima* var. *memnonia* (Delile) Cooke, (*R. memnonia* (Delile) DC., *Dolichos memnonia* Delile) is recorded from Oman, but all the material that I have seen is referable to the type variety. The differences between the two are not very well defined.

15. **Ononis** L.
75 species distributed from Europe and the Mediterranean west to Macaronesia, east to S Siberia, W China and W Himalaya, south to the highlands of Kenya and Ethiopia.

Ononis sicula Guss., Cat. Pl. Boccad.: 78 (1821).
Synonyms: *Ononis viscosa* L. subsp. *sicula* (Guss.) Hub.-Mor. (1970).

Description: Annual herb, up to 20 cm with several stems arising from the base; branched stems erect to ascending, pubescent and glandular, somewhat viscid. Leaves 1(–3)-foliolate, grey-green; stipules 5–7 mm, lanceolate; petiole up to 6 mm; leaflets 10–20 × 3–7 mm, oblong, apex rounded, base cuneate, margin dentate especially so at the apex, glandular. Flowers yellow, solitary in the axils of leaves; pedicel 15–25 mm, delicate. Calyx 9–10 mm, 5-lobed to 4/5 of its length; lobes 7–8 mm, lanceolate, acute, pubescent with glandular hairs. Corolla with standard ± 5 mm. Filaments all united. Pod 10–15 mm, inflated, yellow-brown, chartaceous, splitting at maturity.

Flowering and fruiting: March; April.

Distribution and habitat: Northern Oman, Musandam, in depressions and shaded locations, amongst stones. *Altitude*: 30–1000 m. Distributed in SW Asia from Turkey east to Afghanistan, and south through Arabia to N Africa. Elsewhere in the Arabian Peninsula found in ?Saudi Arabia, ?Yemen.

Distribution map & Illustration: 364.

Notes: Known only from a couple of locations from Musandam; possibly undercollected or overlooked.

16. **Lotononis** (DC.) Eckl. & Zeyh. (nomen. conserv.)
About 110 species mainly South African, a few in N Africa, SW Asia and S Europe.

Lotononis platycarpos (Viv.) Pic.Serm., Webbia 7: 331 (1950).
Basionym: *Lotus platycarpos* Viv. (1830).

Description: Annual herb; stems prostrate, branched, up to 20 cm, pilose. Leaves 3-foliolate; petiole up to 15 mm; stipules ± 5 mm, oblong, pilose; leaflets 3–7 × 2–3 mm, lateral leaflets smaller, oblanceolate, rachis absent. Flowers yellow in terminal, umbellate, inflorescence. Calyx ± 5 mm, tube membranous, lobes 1–2 mm, linear, pilose. Corolla with standard petal up to 4 mm, shortly pilose. Stamens all joined into a tube split on the upper side with 4 long and 6 short anthers. Pod ± 6 × 3 mm, oblong, obtuse, ± inflated.

Flowering and fruiting: ?March.

Distribution and habitat: Northern Oman, in wadis and by irrigated areas. *Altitude*: 50–500 m. Widespread in Africa, and from Arabia eastwards to Pakistan. Elsewhere in the Arabian Peninsula Saudi Arabia, ?UAE.

Distribution map & Illustration: 365.

Notes: The material from Oman is a very small plant collected from northern Oman but the exact location is not given. This is an annual and is probably overgrazed, and hence undercollected.

17. **Crotalaria** L.
About 600 species distributed throughout the tropics and subtropics, particularly Africa and the southern hemisphere.

1. Branched shrubs and subshrubs, leafless for most of the year
   2. Pods glabrous ..... .6. **C. aegyptiaca**
   2. Pods pubescent ..... .7. **C. persica**
1. Annual or perennial herbs or woody at base and producing leafy annual stems
   3. Flowers solitary; hypanthium winged ..... .5. **C. pteropoda**
   3. Flowers in racemes, not solitary; hypanthium not as above
      4. Erect woody herb; pod 30–35 mm, oblong, inflated, rattling when mature ..... .3. **C. retusa**
      4. Woody herbs with ascending to decumbent stems; pods less than 30 mm long, never rattling
         5. Flowers in lax racemes; pod laterally flattened, ellipsoid-globose. ..... .4. **C. leptocarpa**
         5. Flowers in congested racemes; pod inflated but not laterally
            6. Pods globose to subglobose ..... .1. **C. medicaginea**
            6. Pods oblong, curved ..... .2. **C. saltiniana**

1. ***Crotalaria medicaginea*** Lam., Encycl. Meth. 2: 201 (1786).

Description: Annual herb, with somewhat woody stems; stems erect, up to 35 cm, appressed pubescent. Leaves 3-foliolate, petiole up to 5 mm; leaflets 6–15 × 2–4 mm, obovate, margin emarginate; stipules linear. Flowers yellow, in congested racemes; pedicels ± 1 mm to sessile. Calyx 2–3 mm, lobed to half its length, lobes triangular, pubescent, persistent. Corolla with standard petal yellow, tinged brown; keel angular, 3–4 mm. Stamens all joined with 5 long and 5 short anthers. Pods 3–4 × 3–4 mm, globose to subglobose, inflated, beaked at the apex, white-pubescent, 1–2-seeded.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, on escarpment mountain slopes, rocky and pebbly wadi beds, in *Anogeissus–Blepharispermum* woodland. *Altitude*: 10–300 m. Distributed in Afghanistan, Malaysia, China, Australia. Not found elsewhere in the Arabian Peninsula.

Distribution map: 366.

2. ***Crotalaria saltiana*** T.Anders, Bot. Rep.: t. 648 (1812).

Description: Annual or perennial, shrub or large woody herb, bushy; stems up to 60 cm, branched, pubescent. Leaves pale green, 3-foliolate, petiole up to 30 mm; leaflets 20–35 × 10–21 mm, broadly obovate, margin emarginate; stipules absent. Flowers yellow, ± 15 mm, in long congested racemes. Calyx 4–6 mm, lobes acuminate, pubescent, persistent. Corolla with standard petal bright yellow, medially pubescent; keel rounded, 8–12 mm, beak curving inwards. Stamens all joined with 5 long and 5 short anthers. Pods 12–18 × ± 4 mm, oblong, inflated, curved, woolly white-pubescent.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, in coastal grassland. *Altitude*: 0–10 m. Distributed in NE Africa Sudan, Ethiopia, Somalia. Not found elsewhere in the Arabian Peninsula.

Distribution map: 367.

Notes: This is not a common species in Oman. It has been collected only once in 1977 from Kharfawt, lower Wadi Saiq, near Rakhyut (Radcliffe-Smith 5203, K); I have never collected it. This and several other annual species are becoming rare and difficult to find in the grassland and woodland in this area. During the last decade an access road has been made and several houses built in Rakhyut. The grassland and woodland is overgrazed, which has also led to the disappearance of several annuals. Not found elsewhere in the Arabian Peninsula. Classified as Data Deficient on the National Red List.

3. ***Crotalaria retusa*** L., Sp. Pl. 715 (1753).

Description: Annual or perennial herb; stems erect, woody, up to 1.5 m, ribbed, unbranched, appressed pubescent. Leaves simple, 3–7 × 0.9–2 cm, oblong-obovate, apex rounded or emarginate, glabrous above and finely puberulous beneath; stipules ± 5 mm, linear. Flowers yellow, fragrant, in many-flowered racemes. Calyx 7–20 mm, 2-lipped, the upper lobes bigger, triangular-acute, appressed pubescent, persistent. Corolla with standard petal ± 2 cm, yellow with brown-red veins; keel rounded, ± 15 mm, beak twisted. Stamens all joined with 5 long and 5 short anthers. Pods 30–35(–50) × ± 10 mm, oblong, inflated, beaked, glabrous, often reddish mauve in colour, many-seeded, seeds rattling in mature pods.

Flowering and fruiting: February to March; September to October.

Distribution and habitat: Northern and Southern Oman, in open grasslands, coastal cliffs, by roadsides in moist and waste places. *Altitude*: 30–850 m. Pantropical. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map & Illustration: 368.

4. ***Crotalaria leptocarpa*** Balf. f., Bot. Socotra 66: t. 14/a (1888).

Description: Annual or perennial herb, woody at the base and producing annual stems; stems 12–30 cm, prostrate to ascending, branching from the base, glabrous or sparsely appressed pubescent. Leaves 3-foliolate, petiole 5–15 mm; leaflets 5–20(–25) × 2–5 mm, obovate to oblong or oblong to linear-lanceolate, sparsely pubescent or glabrous; stipules linear to linear-lanceolate; bracts linear to linear lanceolate. Flowers yellow in 3–12-flowered lax racemes; pedicels 2–5 mm. Calyx 3–5 mm, 2-lipped, lobed into linear-lanceolate, acuminate lobes, pubescent, persistent. Corolla with standard petal pale yellow with dark purple or red veins; keel rounded, 4–5 mm, glabrous or sparsely hairy on the sides. Stamens all joined with 5 long and 5 short anthers. Pods 7–20 × 5–6 mm, ellipsoid-globose, flattened laterally, beaked at the apex, shortly pubescent, pale green tinged pink.

Flowering and fruiting: July to August.

Distribution and habitat: Southern Oman, Dhofar, on rocky slopes and lower hill slopes of the escarpment mountains, with *Euphorbia balsamifera* and other low woody herbs; also occurring in dry rocky places. *Altitude*: 50–850 m. Distributed in Somalia. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen. Also found on Soqotra.

Distribution map: 369.

Notes: Species variable in the shape of leaves which, vary from being broadly ovate to linear and with leaf-shape varying considerably on the same plant (e.g. see Collenette 8832 at K from Dhofar).

5. ***Crotalaria pteropoda*** Balf. f., Proc. Roy. Soc. Edinb. 11: 508 (1882).

Description: Annual or perennial herb; stems up to 30 cm, spreading, prostrate to decumbent, appressed pubescent. Leaves 3-foliolate, petiole 10–12 mm; leaflets 6–16 × 4–8 mm, obovate to broadly elliptic, the terminal leaflet largest, appressed pubescent on both surfaces or glabrous above; stipules minute. Flowers yellow, solitary in the axils of leaves, sessile with a winged hypanthium 8–10 mm. Calyx 10–15mm, 4-lobed, lobes ovate-elliptic, pubescent outside, margins ciliate, enclosing the corolla, persistent. Corolla with standard petal yellow-brown, reddish on the back and medially pubescent; keel angular, 10–12 mm. Stamens all joined with 5 long and 5 short anthers. Pods 12–14 × ± 7 mm, ellipsoid, inflated, very shortly beaked, pubescent, more so on the suture, many-seeded.

Flowering and fruiting: September.

Distribution and habitat: Southern Oman, Dhofar, in gravel wadi beds and open semi-desert slopes with scattered *Boswellia sacra* and *Acacia etbaica*. *Altitude*: 700–900 m. Distributed in Somalia. Elsewhere in the Arabian Peninsula found on Soqotra.

Distribution map: 370.

6. ***Crotalaria aegyptiaca*** Benth., Hook. f., Lond. J. Bot. 11: 473 (1843).
Vernacular names: ʿaşmat, muburshah; ewţayb (Harsūsī).

Description: Perennial shrub, to 45 cm, leafless for most of the year; stems profusely branched, ribbed, grey-green, appressed pubescent. Leaves simple, sessile, 3–14 × ± 2 mm, oblong-elliptic to obovate, white-pubescent on both surfaces; stipules absent. Flowers yellow, in few-flowered lax racemes; pedicels 2–3 mm. Calyx, 5–8 mm, 2-lipped, lobed into linear-acuminate lobes, pubescent, persistent. Corolla with standard petal yellow with dark brown lines or petals tinged brown; keel angular, 6–10 mm, yellow. Stamens all joined with 5 long and 5 short anthers. Pods 7–10 × ± 4 mm, ellipsoid, inflated, beaked at the apex, glabrous, 1–4 (–6)-seeded, yellow-brown.

Flowering and fruiting: February to April; September to October.

Distribution and habitat: Throughout Oman, in sandy and gravel desert plains, stony wadi beds, wadi banks; common. Not recorded from Musandam. *Altitude*: 0–850 m. Distributed in N Africa, Palestine, Israel, Jordan. Elsewhere in the Arabian Peninsula found in Kuwait, Saudi Arabia, UAE, Yemen.

Distribution map & Illustration: 371.

Notes: Common in the plains where there is some water accumulation after rain, such as in sandy depressions and runnels. Fresh shoots are eaten by goats and camels.

7. ***Crotalaria persica*** (Burm. f.) Merrill, Phillip. J. Sci. 19: 354 (1921).
Basionym: *Cytisus persicus* Burm.f. (1768).
Vernacular names: ḥayk, muburshah, (Harsūsī).

Description: Perennial shrub, to 50 cm, leafless for most of the year; stems profusely branched, intricate, ribbed, grey-green, rigid, appressed pubescent. Leaves 1–3-foliolate, petioles up to 2 mm; leaflets 5–15 × 2–7 mm, obovate to elliptic-lanceolate, often the terminal leaflet largest, white-pubescent on both surfaces; stipules ± 1.5 mm. Flowers yellow, in few-flowered lax racemes; pedicels up to 5 mm. Calyx, 5–6 mm, lobed into triangular-acuminate lobes, pubescent, persistent. Corolla with standard petal yellow with purple veins; keel rounded, 4–5 mm, pale yellow. Stamens all joined with 5 long and 5 short anthers. Pods 7–12 mm, ellipsoid, pinkish in colour, inflated, with a long stylar beak, pubescent, grey-brown.

Flowering and fruiting: March to May; August to October.

Distribution and habitat: Throughout Oman, and on the offshore islands Masirah and Al Halaniyah, in sandy and gravel plains, dry shallow wadi beds, and irrigated places. *Altitude*: 60–480 m. Distributed in Pakistan (Baluchistan), Iran. Elsewhere in the Arabian Peninsula found in Saudi Arabia, UAE, Yemen.

Distribution map & Illustration: 372.

18. **Argyrolobium** Eckl. & Zeyh. (nomen. conserv.)
About 70 species distributed mostly in South Africa, few in the highlands of tropical Africa and the Middle East, N Africa and southern Europe to NW India.

Perennial with a woody base; leaflets linear-lanceolate; flowers mostly yellow; pods 28–32 mm long ..... 1. **A. crotalarioides**
Annual with prostrate stems; leaflets obovate; flowers white with red streaks ..... 2. **A. roseum**

1. ***Argyrolobium crotalarioides*** Jaub. & Spach, Ilustr. 14: 116 (1852).
Vernacular names: sakham.

Description: Perennial subshrub to 20 cm; stems woody at the base, branched, ascending, with white appressed hairs; young shoots ± glaucous. Leaves 3-foliolate, grey-green; leaflets 6–14 × 0.5–1 mm, linear-lanceolate, sericeous; petiole up to 15 mm. Flowers all yellow or occasionally the standard and wings reddish-brown, in terminal lax racemes. Calyx 5–5.5 mm, lobes linear, pilose. Corolla slightly exceeding the calyx; keel obtuse. Stamens joined into a tube. Pods 28–32 × ± 4 mm, flattened, grey-green, sericeous, ± 6-seeded.

Flowering and fruiting: April to May.

Distribution and habitat: Northern Oman, eastern Hajar, on the summit plateau, amongst rocks and boulders, and in rock crevices. *Altitude*: 1800–2000 m. Distributed in Iraq, Lebanon, Syria, Turkey. Elsewhere in the Arabian Peninsula found in Saudi Arabia.

Distribution map: 373.

Notes: The species has been collected only from the summit of Jebel Aswad in the eastern Hajar; so far not recorded from the western Hajar.

2. ***Argyrolobium roseum*** Jaub. & Spach, Ann. Sci. Nat. Ser. 2: 19, 51 (1843).

Description: Annual herb. Stems prostrate, 10–15 cm, with white appressed hairs. Leaves 1–3-foliolate; petiole up to 15 mm; leaflets 5–15 × 5–10 mm, obovate, the terminal leaflet largest, apex obtuse, base of the lateral leaflets oblique, pilose to sericeous. Flowers in few-flowered terminal lax racemes. Calyx 4–5 mm, lobes linear, pilose. Corolla white with red streaks, about as long as the calyx; keel obtuse. Stamens joined into a tube. Pods 18–25 × 1–1.5 mm, grey-green, pilose, 8–12-seeded.

Flowering and fruiting: February to April; July, August.

Distribution and habitat: Throughout Oman, including Musandam, in stony and gravelly wadi beds, by water courses; common annual after rain. *Altitude*: 20–1200 m. Distributed in Afghanistan, Iran, Iraq, India, Pakistan. Elsewhere in the Arabian Peninsula found in Saudi Arabia, UAE, Yemen.

Distribution map & Illustration: 374.

Notes: A specimen collected by Collenette (K) from N Oman, western Hajar, Jebel Shams (± 1200 m) shows mostly 1-foliolate leaves.

19. **Psoralea** L.
About 130 species, distributed in the tropical and temperate regions, most abundant in South Africa.

Leaves 1-foliolate, 3–7 cm long; pod glabrous, not completely enclosed in the calyx ..... 1. **P. corylifolia**
Leaves 3-foliolate, 1–2.5 mm long; pod pubescent, completely enclosed in the calyx ..... 2. **P. plicata**

1. ***Psoralea corylifolia*** L., Sp. Pl.: 764 (1753).
Vernacular names: meḥleb sḥari.

Description: Perennial herb, up to 60 cm; stems woody, sparingly branched, yellow-green, ribbed, white-pilose. Leaves 1-foliolate; petiole 3–4 cm; stipules lanceolate; leaflets (15–)40–90 × (10–)25–80 mm, ovate to subrotund, dentate, apex acute, base truncate, pale green, ± glabrous. Flowers purple to pink-purple, in congested, axillary pedunculate racemes with 3 flowers in the axil of each bract; peduncle 15–25 cm; bract 2–3 mm. Calyx 2-lipped, lobed to 2/3 the length; upper lip of 4 lobes, 3–4 mm, lower lip 4–5 mm, of 1 lobe; lobes oblong, obtuse, sparsely pilose, with sessile glands. Corolla with standard petal 5–6 mm, keel pale yellow at the base, purple at apex. Stamens united. Fruit 4–5 mm, ovoid, pitted, dark-brown, glabrous.

Flowering and fruiting: August to October.

Distribution and habitat: Southern Oman, wadis and on exposed summit grassland. *Altitude*: 50–900 m. Distributed from NE Africa (Somalia), westwards through Arabia to China. Elsewhere in the Arabian Peninsula found in Yemen. Also found on Soqotra

Distribution map: 375.

Notes: Native of India and Ceylon. It has been cultivated in Oman and is now found as an escape in one or two locations near Tawi Attair in Dhofar, where it occupies a fairly large area almost as monospecific stand; also found in a few coastal wadis. Not browsed by goats or camels. The seeds have been used in traditional medicine for various ailments. They are believed to have 'cooling properties' and are recommended to treat 'hot' diseases. They are used to treat mastitis and painful swellings, fevers, or rubbed over chest to relieve breathing difficulty. Seeds when crushed give out a pleasant fragrance, and are used as a deodorant, rubbed over hands, legs and arms.

2. ***Psoralea plicata*** Delile, Fl. Egypt.: 252, t. 27, f. 3 (1812).
Vernacular names: ḥazam, khazamī, ya'aleyn (Harsūsī, Jibbālī).

Description: Small perennial shrub or undershrub, up to 60 cm; stems branched, grey-green, ribbed, sparsely pilose and glandular. Leaves trifoliolate; petiole 5–10 cm; stipules lanceolate; leaflets 10–25 × 4–12 mm, obovate, irregularly sinuate, apex acute, base truncate, grey-green, pubescent and glandular. Flowers white, in 1–3 fascicled many-flowered racemes; pedicel 1–2 mm; bract 1–2 mm. Calyx 2-lipped, lobes unequal, strongly nerved. Corolla with standard petal 4–5 mm, white or purple white. Stamens all united. Pod ellipsoid, ± as long as the calyx, not beaked, pubescent.

Flowering and fruiting: December to May.

Distribution and habitat: Central and southern Oman, in dry muddy and sandy wadis and plains. *Altitude*: 20–100 m. Distributed from N Africa westwards through Arabia to India. Elsewhere in the Arabian Peninsula found in Saudi Arabia.

Distribution map: 376.

Notes: The species is recorded to be grazed by all livestock, although I have seen that it is not readily eaten and is left alone by camels and goats.

20. **Lotus** L.
60–100 species distributed mainly in the Mediterranean region.

1. Flowers yellow
   2. Flowers 1–2; pod slightly curved . . . . . .4. **L. halophilus**

2. Flowers 3–5, umbellate; pod straight ..... 5. **L. corniculatus**
1. Flowers red, pink to pink-purple
3. Leaves sessile; pods ± 2 mm wide ..... 1. **L. garcinii**
3. Leaves petiolate; pods narrow, linear
4. Leaflets 4–7 × 1–3 mm; pods ± 10 mm, linear ..... 2. **L. schimperi**
4. Leaflets 7–15 × 1–4 mm; pods 25–28 mm, narrow ..... 3. **L. laricus**

1. ***Lotus garcinii*** DC., Prodr. 2: 212 (1825).
Synonyms: *Lotus stocksii* Boiss.(1872); *Lotus sherifii* Rech. f. et Esfand. (1951).

Description: Perennial herb, grey-green, woody at base; stems ± prostrate, branched, up to 25 cm, silky pubescent to pilose. Leaves 5-foliolate, sessile, 2 at the base like stipules; leaflets sessile, (3–)5–9 × (1–)4–5 mm, obovate, obtuse to retuse, cuneate at base, grey pilose on both surfaces or glabrous above. Flowers pink to reddish, 1–2 in axillary inflorescence, sessile. Calyx 5–8 mm, 5-lobed, lobed unequal, about twice as long as the tube, pilose. Upper filament free, the other 9 united. Pod 7–12 × ± 2 mm, glabrous or pubescent, olive green to brownish, ± 6-seeded.

Flowering and fruiting: February to April; September to October.

Distribution and habitat: Throughout Oman, sandy wadis and depressions in gravel wadis, coastal dunes and sandy coastal plains. *Altitude*: 0–80 m. Distributed from Somalia and Egypt to Arabia, SE Iran and Pakistan. Elsewhere in the Arabian Peninsula found in Saudi Arabia, UAE. Also found on Soqotra.

Distribution map & Illustration: 377.

Notes: Wild-collected seed of this species is held by the Millennium Seed Bank at Wakehurst Place, Royal Botanic Gardens, Kew, UK.

2. ***Lotus schimperi*** Steud. ex Boiss., Fl. Or. 2: 170 (1872).
Synonyms: *Lotus glinoides* sensu Cuf., Enum.: 258 (1955), non Del.

Description: Annual herb with a single tap root; stems grey-green, several arising from the base, prostrate, up to 15 cm, sparingly pilose. Leaves 5-foliolate, 2 at the base like stipules; petiole 1–3 mm; leaflets sessile, 4–7 × 1–3 mm, oblanceolate, obtuse, cuneate at base, sparsely pilose. Flowers red, in (1–)2–4-flowered axillary umbellate inflorescence, sessile. Calyx ± 5 mm, tube membranous, lobes acute, pilose on the margins. Corolla ± 4 mm. Upper filament free, the other 9 united. Pod ±10 mm × 2 mm, linear, glabrous, brown.

Flowering and fruiting: March to April.

Distribution and habitat: Northern and Central Oman, Musandam, in sandy wadis and depressions in gravel wadis. *Altitude*: 100–150 m. Distributed in Sudan, Egypt eastwards through Arabia and Iran to Pakistan.Elsewhere in the Arabian Peninsula found in Saudi Arabia, UAE. Also found on Soqotra.

Distribution map & Illustration: 378.

3. ***Lotus laricus*** Rech. f., Aellen & Esfand., Bot. Jahrb. Syst. 75: 333 (1951).

Description: Annual or perennial herb, somewhat woody at base, grey-green; stems ± prostrate, several arising from the base, up to 30 cm, ± glabrous. Leaves 5-foliolate, 2 at the base like stipules; petiole up to 4 mm; leaflets 7–15 × 1–4 mm, lateral leaflets marginally smaller,

oblanceolate, acute, cuneate at base, glabrous on upper surfaces, sparsely grey-pilose on the midrib below. Flowers axillary, sessile. Calyx 4–5 mm, lobes slightly longer than the tube, sparsely pilose on the margins. Corolla deep pink to purple, exserted from the calyx; standard petal ± 7 mm. Upper filament free, the other 9 united. Pod 25–28, narrow, beaked with remnants of style persisting, glabrous, many-seeded.

Flowering and fruiting: March.

Distribution and habitat: Northern Oman, Musandam, in waste and irrigated places. *Altitude*: ± 80 m. Distributed in Iran and Baluchistan. Elsewhere in the Arabian Peninsula found in the UAE.

Distribution map: 379.

4. ***Lotus halophilus*** Boiss. & Spruner, Diagn. Pl. Or. Nov. ser. 1, 1(2): 37 (1843).
Synonyms: *Lotus villosus* Forssk. (1775), non Burm., f. (1768).

Description: Annual herb, grey-green; stems several arising from the base, branched, ± prostrate, up to 25 cm, appressed-hairy. Leaves 5-foliolate, the lowest pair stipule-like on the stem; leaflets 2–12 × 1–5 mm, oblanceolate to elliptic, acute, cuneate at base, appressed hairy. Flowers yellow, axillary, solitary or paired; peduncles ± 10 mm. Calyx ± 5 mm. Upper filament free, the other 9 united. Pod 15–25, linear, slightly curved, glabrous, dark brown when mature.

Flowering and fruiting: February to March.

Distribution and habitat: Northern Oman, in gravel wadis. *Altitude*: ± 50 m. Distributed in E Mediterranean, Sinai, Syria, Iraq, S Iran. Elsewhere in the Arabian Peninsula found in Kuwait, Saudi Arabia, ?UAE.

Distribution map: 380.

Notes: Although this species is recorded to be one of the most widespread annual in arid lands, it is surprisingly uncommon in Oman. It has been recorded from Muscat area, but may well be undercollected.

Species expected to occur in Oman

5. ***Lotus corniculatus*** L., Sp. Pl. 2: 775–776 (1753).

Description: Annual herb, grey-green; stems ± prostrate, up to 30 cm, ± glabrous. Leaves 5-foliolate, the lowest pair stipule-like on the stem; leaflets 5–20 × 3–10 mm, oblanceolate, acute or obtuse, cuneate at base, ± glabrous. Flowers yellow, sometimes orangish, umbellate, 3–5 on axillary peduncles. Calyx ± 7 mm. Pod 12–30, narrow, straight, many-seeded.

Flowering and fruiting: February to March.

Distribution and habitat: Northern Oman, as a weed in gardens. *Altitude*: ± 30 m. Distributed throughout temperate Asia and Europe and N Africa. Elsewhere in the Arabian Peninsula found in Saudi Arabia, ?UAE, Yemen.

Notes: This species is not recorded from Oman, but is expected to occur as a weed in gardens. It is probably not collected as gardens are usually well maintained in the capital and weeds not allowed to grow to flowering size.

21. **Pseudolotus** Rech.f.
Distributed in Oman, S Iran and Pakistan.

Pseudolotus makranicus (Rech.f. & Esfand.) Rech. f., Biol. Skr. Dan. Vid. Selsk. 9(3): 21 (1958).
Basionym: *Lotus makranicus* Rech.f. et Esfand. (1951).

Description: Annual herb; stems prostrate, up to 15 cm, white-villous. Leaves 3–4-foliolate, 4th leaflet inserted below the terminal 3; petiole ± 6 mm; stipules represented by glands; leaflets 8–15 × 2–6 mm, obovate to spatulate, obtuse to acute, mucronate, densely villous and glandular-punctate. Flowers reddish yellow, in 2-flowered axillary umbel; peduncle 7–20 mm, villous; bracts 6–8 mm, elliptic, villous. Calyx ± 4 mm, lobed to half the length, acute, villous. Corolla with standard± 5 mm. Fruit 9–13 mm, glabrous, 3–5-seeded.

Flowering and fruiting: February to April.

Distribution and habitat: Northern Oman, in gravelly and sandy wadis, and immediate plains of the northern mountains. *Altitude*: 50–350 m. Distributed in Iran and Baluchistan (SW Pakistan). Elsewhere in the Arabian Peninsula found in UAE.

Distribution map: 381.

22. **Taverniera** DC.
10 species distributed in W India, the Middle East and NE Africa.

1. Leaves mostly 3-foliolate
   2. Calyx woolly pubescent . . . . . .3. **T. brevialata**
   2. Calyx glabrous or with a few hairs . . . . . .5. **T. lappacea**
1. Leaves mostly 1-foliolate
   3. Stems covered with remnants of stipules and leaves; internodes short . . . . . .4. **T. multinoda**
   3. Stems and internodes not as above
      4. Stems glabrous to sparsely pubescent . . . . . .1. **T. cuneifolia**
      4. Stems densely white-sericeous . . . . . .2. **T. spartea**

1. ***Taverniera cuneifolia*** (Roth) Arn., Nov. Act. Nat. Cur. 18(1): 332 (1836).
Basionym: *Hedysarum cuneifolium* Roth (1821).
Synonyms: *Taverniera glabra* Boiss. (1843); *T. stocksii* Boiss. (1982).
Vernacular names: ʿaşmat, ʿaşmut, newot (Harsūsī).

Description: Annual or biennial shrub; stems erect, up to 1 m, grey-green, white-puberulous to glabrous. Leaves 1–foliolate or sometimes trifoliolate; petiolule 0.5–2 mm; stipules ± 4 mm, bifid, brown; leaflets 6–14 × 6–10 mm, broadly obovate, entire, obtuse or sometimes emarginate and mucronate at apex, glabrous or sometimes the younger leaves with a few hairs, glaucous. Flowers 2–5, in pedunculate racemes, glabrous, flowers remaining for a long time, becoming dry, brown and papery in fruit; pedicel ± 1.5 mm; bracts and bracteoles ± 2 mm, caducous. Calyx 2.5–3 mm, teeth ± 2 mm, white-pubescent, minutely ciliate on the margins. Corolla with standard petal 8–9 × 6–7 mm, pink to purple with dark purple veins; wings ± 4 mm; keel 7–8 mm. Upper filament free, the other 9 united. Pod flattened, 1–3-segmented, each segment ± 5 mm long, pubescent and densely covered with curved or hooked spines up to 2 mm long, green tinged with brown at the edges.

Flowering and fruiting: February to April.

Distribution and habitat: Northern Oman, common in gravel wadis and wadi fans, slopes and lower slopes of the northern mountains, and coastal wadis, on sandy and saline soils. *Altitude*: 50–800 m. Distributed in Iran and SW Pakistan (Baluchistan), India, and coastal Somalia. Elsewhere in the Arabian Peninsula found in UAE.

Distribution map & Illustration: 382.

2. ***Taverniera spartea*** (Burm. f.) DC., Prodr. 2: 339 (1825).
Basionym: *Hedysarum spartium* Burm. f. (1768).

Description: Glaucous shrub; stems erect to ascending, up to 1 m, grey-brown, densely white-pubescent, leafless for most of the year. Leaves 1-foliolate; petiolule ± 1 mm; stipules ± 2 mm, bifid, brown, falling soon; leaflets 3–5 × 2–4 mm, obovate to broadly ovate, entire, obtuse or emarginate and mucronate at apex, cuneate at base, densely pubescent on both surfaces, caducous. Flowers 1–2, in pedunculate racemes, pubescent; pedicel ± 1.5 mm; bracts and bracteoles ± 1 mm, caducous. Calyx 2–3 mm, teeth 1–2 mm, pubescent. Corolla with standard petal 7–8, pink with dark pink to purple veins; wings ± 4 mm; keel ± 6 mm. Upper filament free, the other 9 united. Pod flattened, 2–3-segmented, each segment 4–5 mm long, pubescent and covered with straight curved or spines up to 2 mm long, brown.

Flowering and fruiting: February to April; September to December.

Distribution and habitat: Throughout Oman, in dry habitats, in gravel and stony wadis, coastal wadis, in sandy and saline soils. *Altitude*: 20–200 m. Distributed in Iran and SW Pakistan (Baluchistan). Elsewhere in the Arabian Peninsula found in Bahrain, Qatar, Saudi Arabia, UAE.

Distribution map: 383.

3. ***Taverniera brevialata*** Thulin, Acta Univ. Ups. Symb. Bot. Ups. 25: 82–83 (1985).
Type: Oman, 9 km E of Mirbat, 22 October 1977, A. Radcliffe-Smith 5551 (holotype K).

Description: Glaucous perennial shrub up to 50 cm; stems erect, spreading, glabrous to sparsely pubescent.. Leaves often 3-foliolate, but also 1-foliolate present; petiolule 5–12 mm; stipules 2–4 mm, bifid, brown; leaflets with the terminal leaflet larger than the laterals, 5–20(–40) × 4–17(–32) mm, obovate to rotund, entire, obtuse to rounded, sometimes emarginate and mucronate at apex, glabrous to sparsely pubescent. Flowers 5–20, in pedunculate racemes, sparsely pubescent; flowers brown and chaffy in fruit; pedicel ± 1.5 mm; bracts and bracteoles ± 2 mm, caducous. Calyx 3–4 mm, teeth ± 3 mm, lanceolate, glabrous, but sometimes with a few hairs. Corolla with standard petal 6–8 mm, pink to pale pink with dark pink veins; wings ± 3 mm. Upper filament free, the other 9 united. Pod flattened, 1(–2)-segmented, each segment ± 5 mm long, pubescent and covered with curved or hooked spines up to 2 mm long, brown.

Flowering and fruiting: September to December.

Distribution and habitat: Southern Oman, Dhofar, and offshore on Al Halaniyah Island, in dry gravel wadis and foothills, especially in the north draining wadis of the Dhofar mountains. *Altitude*: 0–500 m. Endemic to southern Oman.

Distribution map & Illustration: 384.

4. ***Taverniera multinoda*** Thulin, Acta Univ. Ups. Symb. Bot. Ups. 25: 83–86 (1985).

Description: Small shrub up to 50 cm; stems grey-green, sparsely to densely white-pubescent, covered with remnants of stipules and leaves.. Leaves 1–foliolate or sometimes trifoliolate; petiolule 0.5–1.5 mm; stipules 1–2 mm, bifid, brown, pubescent, somewhat persistent; leaflets 4–20 × 3–15 mm, broadly obovate, entire, obtuse or sometimes emarginate and mucronate at apex, cuneate at base, glabrous to pubescent above, sparsely to densely pubescent beneath. Flowers 1–6, in pedunculate racemes, pubescent; pedicel 1–2 mm; bracts and bracteoles ± 2 mm, caducous. Calyx 3–4 mm, teeth ± 3 mm, white-pubescent. Corolla with standard petal 9–10 mm, pink or pale yellow tinged with pink; wings 6–7 mm. Upper filament free, the other 9 united. Pod flattened, 1–3-segmented, each segment 4–7 mm long, pubescent and densely covered with straight or curved or hooked spines up to 2 mm long, sometimes spines almost absent, yellow-brown.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, in dry coastal wadi beds, and coastal rocky slopes on limestone. *Altitude*: 0–800 m. Distributed in Somalia. Elsewhere in the Arabian Peninsula found in Yemen.

Distribution map & Illustration: 385.

5. ***Taverniera lappacea*** (Forssk.) DC., Prodr. 2: 339 (1825).
Basionym: *Hedysarum lappaceum* Forrsk. (1775).
Vernacular names: weyl, wīyel (Harsūsī).

Description: shrub or woody herb, up to 1 m; stems grey-green, white-pubescent with spreading hairs. Leaves 3-foliolate; petiolule 0.5–1 mm; stipules 1–3 mm, bifid, brown, persistent; leaflets 3–14 × 3–12 mm, obovate to obcordate, entire, obtuse or sometimes emarginate and mucronate at apex, base cuneate, woolly pubescent on both surfaces. Flowers 1–5, in pedunculate racemes, persisting and becoming brown and chaffy in fruit; pedicel ± 1 mm; bracts and bracteoles ± 1 mm, caducous. Calyx 3–4 mm, teeth ± 3 mm, lanceolate acuminate, woolly pubescent. Corolla with standard petal 5–7 mm, yellowish, pink or purple; wings 2–3 mm. Upper filament free, the other 9 united. Pod flattened, 1–2-segmented, each segment 6–8 mm long, pubescent and covered with straight or curved or hooked spines up to 3 mm long, brown.

Flowering and fruiting: September to October.

Distribution and habitat: Southern and central Oman, Dhofar, and Al Halaniyah Island, in dry gravel wadis beds and wadi fans, coastal plains and wadis. *Altitude*: 0–500 m. Distributed in Iran, Pakistan, NE Africa (Sudan, Ethiopia, Somalia), ?Egypt. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map & Illustration: 386.

Notes: The name of this species is based on a specimen collected from Yemen by P. Forsskål s.n. (lectotype BM, isolectotype S).

23. **Astragalus** L.
About 200 species distributed mainly in the north temperate regions; widespread in W and C Asia.

1. Shrubs to 1 m; lateral branches spine-like; leaves in fascicles; calyx inflated and enclosing the fruit . . . . . .8. **A. fasciculiformis**
1. Annual herbs with or without a woody base
   2. Hairs bifurcate; pod ovoid-ellipsoid, densely pubescent . . . . . .4. **A. vogelii**
   2. Hairs simple, basifixed
      3. Pods in groups of 3–6, in erect heads or spreading stellately
         4. Calyx with white hairs; pods in groups of 4–6 . . . . . .5. **A. schimperi**
         4. Calyx with white and black hairs; pods in groups of 3–4 . . . .6. **A. tribuloides**
      3. Pods not in groups
         5. Flowers in long pedunculate heads; peduncle ± 7 cm; bracts with black hairs . . . . . .7. **A. termeanus**
         5. Flowers not as above; bracts without black hairs
            6. Pod deeply grooved along one side . . . . . .1. **A. arpilobus**
            6. Pod not above
               7. Hairs black and white; pod reticulately ridged . . . . . .2. **A. crenatus**
               7. Hairs white only; pod not reticulately ridged . . . . . .2. **A. eremophilus**

1. ***Astragalus arpilobus*** Kar & Kir., Bull. Soc. Imp. Nat. Mosc. 15: 336 (1842) subsp. ***hauarensis*** (Boiss.) Podlech in Rech.f. (ed.) Flora Iraniaca, Papilionaceae III, 174: 9 (1999).

Synonyms: *Astragalus hauarensis* Boiss.(1849); *A. gyzensis* Bunge (1868).

Description: Annual herb; stems prostrate or creeping or decumbent, up to 15 cm, densely sericeous to pubescent with simple basifixed hairs. Leaves stipulate, imparipinnate with 5–9 leaflets; leaflets 5–12 × 3–10 mm, elliptic-oblong to elliptic, apex rounded to emarginate, sericeous to pubescent. Flowers lilac to white in 3–5 flowered racemes. Calyx ± 7 mm, lobes acute. Corolla with standard ± 10 mm. Pods sessile, 15–30 × 2.5–3 mm, almost circular in section, curved, deeply grooved along one side, sericeous to pubescent, partly bilocular, 12–20-seeded.

Flowering and fruiting: February to March.

Distribution and habitat: Northern and Central Oman, in sandy areas, wadi beds and wadi banks. *Altitude*: 20–250 m. Distributed in N Africa, Palestine, Jordan, Iraq, Iran, Afghanistan, Pakistan. Elsewhere in the Arabian Peninsula found in Bahrain, Kuwait, Qatar, Saudi Arabia, UAE, Yemen.

Distribution map & Illustration: 387.

Notes: Grazed by all livestock. The name of this taxon is based on a specimen collected from Jordan ('Arabia petraea') by ?E. Boissier (lectotype G-BOIS).

2. ***Astragalus crenatus*** Schultes, Obs. Bot. 156 (1809).

Synonyms: *A. corrugatus* Bertol. (1810); *A. tenuirugis* Boiss. (1849).

Description: Annual herb to 30 cm; stems ascending to decumbent to prostrate, glabrous to sparsely pubescent, with black and white hairs; hairs basifixed. Leaves stipulate, imparipinnate with 7–11 pairs of leaflets; leaflets 7–10 × 1.5 mm, linear to oblong, apex emarginate, base tapering, sparsely pubescent. Flowers in small terminal racemes. Calyx ± 3 mm, lobes acute, pubescent with black and white hairs; corolla ± 5 mm, violet. Pods sessile, 20–50×2.5–3 mm, curved, glabrous, reticulately ridged, beak hooked, partly bilocular, 14–20-seeded, pale green to straw-yellow when mature.

Flowering and fruiting: February to April.

Distribution and habitat: Northern Oman including Musandam, in cultivated fields, in damp soil and shaded locations. *Altitude* 0–1500 m. Distributed from Egypt to Syria, and eastwards from Iraq to SW Pakistan. Elsewhere in the Arabian Peninsula found in Bahrain, Kuwait, Qatar, Saudi Arabia, Yemen.

Distribution map: 388.

Notes: Flowering after winter rain.

3. ***Astragalus eremophilus*** Boiss., Diagn. Pl. Or. Nov. ser. 1, (2): 54 (1843)
subsp. ***eremophilus***

Description: Annual herb, up to 45 cm; stems woody at the base, erect to ascending, spreading, white pilose, hairs basifixed. Leaves stipulate, imparipinnate with 4–6 pairs of leaflets; leaflets 3–8 × 2–3 mm, obovate to elliptic, pilose; stipules triangular. Flowers pale yellow to lilac, ± 5 mm, in axillary racemes. Calyx 4–5 mm, teeth ± 3 mm, acute, membranous, pilose. Pod sessile 12–15 × 2.5–3 mm, curved, white-pilose, ± 20-seeded, dehiscent.

Flowering and fruiting: February to March.

Distribution and habitat: Northern and Central Oman, in sandy and gravelly locations, wadi beds and coasts. *Altitude*: 10–250 m. Distributed in Egypt, SW Pakistan, SW Iran. Elsewhere in the Arabian Peninsula found in Qatar, Saudi Arabia, UAE.

Distribution map & Illustration: 389.

Notes: Grazed by goats and camels. The name of this species is based on a specimen collected near Jedda (Dschedda), Saudi Arabia by G.W. Schimper 777 (lectotype G-Boiss; isolectotype BM, G, K, P, W).

4. ***Astragalus vogelii*** (Webb) Bornm., Bot. Jahrb. Syst. 108: 259–270 (1887)
subsp. ***fatimensis*** Maire, Mem. Soc. Hist. Nat. Afr. Nord. 3: 126 (1933).
Synonyms: *A. fatimensis* Hochst. ex Chiov. (1903).

Description: Annual herb; stems erect to ascending or trailing, up to 20 cm with bifurcate hairs. Leaves stipulate, imparipinnate with 5(–6) pairs of leaflets; leaflets 3–7 × 2–4 mm, elliptic-oblong to oblong, apex emarginate, appressed pubescent. Flowers pink to mauve, in few-flowered sessile spikes. Calyx 3-4 mm, teeth acute white pilose; corolla ± 5 mm. Pods sessile, 6–10 × 2–3 mm, ovoid-ellipsoid, densely pubescent, beaked.

Flowering and fruiting: February to March.

Distribution and habitat: Northern Oman, in sandy locations in wadi beds and banks, and in cultivated fields. *Altitude*: 50–200 m. Distributed in N Africa, Iran, Pakistan, India. Elsewhere in the Arabian Peninsula found in Saudi Arabia, UAE, Yemen.

Distribution map & Illustration: 390.

Notes: In the Arabian Peninsula subsp. *vogelii* is found in Saudi Arabia.

5. ***Astragalus schimperi*** Boiss., Diagn. Pl Or. Nov., ser 1, 2: 53 (1843).

Description: Annual herb; stems prostrate, up to 20 cm, pubescent with simple hairs. Leaves stipulate, imparipinnate with 4–8 pairs of leaflets; leaflets 5–10 × 2–5 mm, oblong-elliptic to

linear-oblong, apex acute, white-pubescent. Flowers in a few-flowered, pedunculate heads. Calyx ± 4 mm, lobed above with small acute lobes ± 1 mm, pubescent; corolla pink to purple-pink, ± 9 mm. Pods usually in groups of 4–6, sessile, 14–15 × ± 3 mm, spreading stellately or erect in heads, white-pilose, partly bilocular.

Flowering and fruiting: February to March.

Distribution and habitat: Northern Oman, in sandy and gravel plains, wadi beds, by cultivations and by roadsides, coming up after winter rain. *Altitude*: 10–150 m. Distributed in Egypt, Syria, Iraq, Jordan, Sinai, Israel, Palestine, Iran, SW Pakistan. Elsewhere in the Arabian Peninsula found in Bahrain, Kuwait, Qatar, Saudi Arabia, UAE, Yemen.

Distribution map: 391.

Notes: The name of this species is based on a specimen collected from Jordan ('Arabia petraea') by G.W. Schimper 238 (holotype G-BOIS; isotypes at several herbaria incl. BM, E, G, K (see Podlech op. cit., p. 29).

6. ***Astragalus tribuloides*** Del., Fl. Aegypt. Illustr. 70 (1813).
Synonyms: *A. minutus* Boiss. (1849); *A. tribuloides* var. *minutus* (Boiss.) Boiss. (1872).

Description: Annual herb, up to 20 cm; stems ascending to decumbent, grey-green, branching from the base, pubescent with simple hairs; hairs basifixed. Leaves stipulate, imparipinnate with 5–8 pairs of leaflets; leaflets 5–10 × 3–7 mm, oblong-elliptic to linear-oblong, apex acute, white-pubescent. Flowers lilac to white, in a few-flowered sessile or subsessile heads. Calyx ± 4 mm, lobed above with small acute lobes ± 1 mm, pubescent with white and black hairs; corolla pink or pinky-white ± 9 mm. Pods usually in groups of 3–4, sessile, 5–10 × 3 mm, arched, spreading stellately or erect, white-pilose, partly bilocular.

Flowering and fruiting: March to April.

Distribution and habitat: Northern Oman, including Musandam, in cultivated fields. *Altitude*: 50–450 m. Distributed in N Africa,, Syria, Turkey, Caucasus, Iraq, Jordan, Sinai, Israel, Iran, SW Pakistan. Elsewhere in the Arabian Peninsula found in Kuwait, Qatar, Saudi Arabia, UAE, Yemen.

Distribution map: 392.

7. ***Astragalus termeanus*** Maasoumi & Podlech, Iran. J. Bot. 4: 87 (1988).
Vernacular names: farrākh al ḥuṣaynī (Eastern Hajar, Jebel Aswad area).

Description: Annual herb with a woody rootstock; stems short, the whole plant densely white-pilose. Stipules 5–6 mm, linear-lanceolate, acuminate, white-pilose. Leaves 3–4, arising from the base, paripinnate, 6–8 cm long with 12–17 pairs of leaflets; leaflets 5–8 × 2–3 mm, apical leaflets smaller in size, elliptic, white-pilose on both surfaces. Flowers pink-purple, with short pedicels, in pedunculate spicate heads; peduncles ± 7 cm; heads 4–5 cm; pedicels 0.5–1 mm. Bracts 4–5 mm, linear, acuminate with hairs black. Calyx 12–15 mm, 5-lobed, lobes linear, about as long as the calyx tube and almost reaching the corolla, densely pilose; corolla pink-purple, 12–15 mm. Pod not seen.

Flowering and fruiting: April.

Distribution and habitat: Northern Oman, in the western Hajar on the Jebel Akhdar range in the *Juniperus-Olea* open woodland, and in the eastern Hajar on the summit plateau with

Ziziphus, *Prunus* and *Ceratonia*, in small sandy depressions amongst rocks. *Altitude*: 2000–2300 m. Distributed in Iran. Not found elsewhere in the Arabian Peninsula.

Distribution map & Illustration: 393.

Notes: Common, but localized and not abundant. This species belongs to a group of endemic species (Section *Hymenostegis* Bunge) found on the dry high plateau in Iran.

8. ***Astragalus fasciculifolius*** Boiss., Diagn. Pl. Or. Nov. ser. 1, (2): 73 (1843)
subsp. ***arbusculinus*** (Bornm. & Gauba) Tietz, Mitt. Bot. Staatss. Munchen 27: 276 (1988).
Synonyms: *Astragalus arbusculinus* Bornm. & Gauba (1941); *A. fasciculifolius* sensu auctt., Mandaville (1985); Jongbloed (2003).
Vernacular names: ānora, iḥinūnū (fruit), timī, timyah (Musandam), hindris (eastern Hajar).

Description: Shrub 50–60 cm; stems profusely branched, bark white, lateral branches spine-like, up to 2 cm, white-grey tipped brown, sharply pointed at the tip, pubescent with basifixed hairs. Stipules 1–3 mm, triangular, densely pilose. Leaves paripinnate, with 2(–3) pairs of leaflets, glaucous, shortly petiolate, in fascicles on the main stem and the spiny lateral branches; leaflets 5–9 × 2–4 mm, obovate to oblong-obovate, obtuse, pubescent. Flowers solitary or 1–2 in the axils of leaves. Calyx 11–12 mm, tubular, becoming inflated and membranous, pinkish at first becoming whitish later, lobes short acute; corolla pink to pink-purple, ± 15 mm. Pod ± 10 mm, stipitate, enclosed within the calyx, 2-seeded.

Flowering and fruiting: January to April.

Distribution and habitat: Northern Oman, Musandam and Eastern Hajar, on rocky slopes, crevices of rocks, besides track roads. *Altitude*: 50–1500 m; found at lower altitudes in Musandam but above 1400 m in the eastern Hajar mountains. Distributed in Iran. Elsewhere in the Arabian Peninsula found in Saudi Arabia, UAE.

Distribution map & Illustration: 394.

Notes: Two subspecies are recognized, subsp. *fasciculifolius* from Iran, and subsp. *arbusculinus* from Iran and Oman: these differ in the calyx nerves being 5–8(–10) in subsp. *arbusculinus* and 10–12 in subsp. *fasciculifolius*. Children pick and suck the flowers for the sweet nectar. Bees feeding on this species produce a good quality honey (recorded from Musandam).

24. **Podolotus** Royle
Distributed from Oman, Iran to NW India.

Podolotus hosackioides Benth. in Royle, Illlustr. Bot. Himal. 198 (1835).
Basionym: *Astragalus hosackioides* (Benth.) Benth. & Hook. f. (1865); *Kerstania nuristanica* Rech. f. (1957); *Lotus hosackioides* (Royle ex Benth.) S.I. Ali (1977).

Description: Dwarf perennial. Stems prostrate, spreading, up to 12 cm, glabrous to sparsely pubescent. Leaves paripinnate with 6 pairs of leaflets; leaflets 0.5–2 mm, obovate to suborbicular, sparsely pilose. Flowers solitary in the axils of leaves. Calyx ± 2 mm, lobed above; corolla 4–5 mm, back of the standard petal red, yellow within. Pods somewhat inflated, 10–11 mm, 2–3-seeded, glabrous, dehiscent.

Flowering and fruiting: March to April.

Distribution and habitat: Northern Oman, on the western Hajar range, in sandy depressions amongst rocks and stones. *Altitude*: ± 2000 m. Distributed in Iran, Afghanistan, Pakistan, India. Known only from Oman in the Arabian Peninsula.

Distribution map: 395.

Notes: This a much smaller plant than recorded elsewhere in its range of distribution. Not common and so far known from a single gathering.

25. **Medicago** L.

About 56 species distributed in the Mediterranean region, NE and S Africa; a few species cultivated for fodder.

1. Stipules lanceolate, entire; flowers violet or pale purple; fruit without spines ....2. **M. sativa**
1. Stipules lanceolate, 2–3-dentate or laciniate; flowers yellow; fruit with hooked spines
   2. Stipules lanceolate, 2–3-dentate .....1. **M. laciniata**
   2. Stipules laciniate .....3. **M. polymorpha**

1. ***Medicago laciniata*** (L.) Mill., Gard. Dict. ed. 8, no. 5, (1768)
   var. ***brachycantha*** Boiss., Diagn. Ser 1, 9: 10 (1849).

Description: Annual herb; stems several arising form the base, decumbent to ascending, spreading, up to 20 cm glabrous. Leaves 3-foliolate, grey-green; stipules lanceolate, 2–3-dentate; petiole up to 30 cm; leaflets 5–15 × 7–9 mm, dentate, apex truncate to retuse, base cuneate, glabrous above, ± glabrous on the surface below and sparsely pilose on the midrib. Flowers yellow, 1–2, in axillary racemes; peduncle up to 2 cm; pedicel 5–7 mm. Calyx ± 2 mm, lobes ± 0.5 mm, sparsely pilose. Corolla with standard ± 4 mm, the whole flower well exserted from the calyx. Upper filament free, the other 9 united. Pod spherical or ovoid, with 5–7 coils, 8–10 seeded with hooked spines ± 2 mm long arranged in 2 rows on the thickened suture.

Flowering and fruiting: March.

Distribution and habitat: *Altitude*: Northern Oman, in wadis and wadi banks, in muddy and shady locations, amongst grass and other annual herbs. *Altitude*: 20–100 m. Distributed from NE Africa through to Pakistan; southern Europe. Elsewhere in the Arabian Peninsula found in Bahrain, Kuwait, Qatar, Saudi Arabia, UAE, Yemen. Also found on Soqotra.

Distribution map & Illustration: 396.

2. ***Medicago sativa*** L., Sp. Pl. 778 (1753).
Vernacular names: jat, qat. English name: alfalfa, lucerne.

Description: Annual or short-lived perennial herb; stems erect to ascending, up to 50 cm, ± glabrous. Leaves 3-foliolate, green; stipules lanceolate; leaflets 3–20 × 2–90 mm, obovate to oblong-lanceolate, apex dentate, base cuneate, appressed pubescent. Flowers violet or pale purple, in pedunculate axillary racemes. Fruit orbicular with 1–4 spirals, glabrous.

Flowering and fruiting: February to April; September to November.

Distribution and habitat: Northern and southern Oman, cultivated for fodder, but found as an escape near farms, in wet and irrigated places. *Altitude*: 20–100 m. Distributed throughout the warm tropical countries of the world. Widely cultivated throughout Arabia.

Distribution map: 397.

Notes: In addition to its use as fodder, the leaves have been used in traditional medicine to heal bruises, fractures and to stop nose bleeds; seeds have been as an aphrodisiac.

3. ***Medicago polymorpha*** L., Sp. Pl. 779 (1753).

Description: Annual herb; stems ± erect to decumbent, branched, spreading, up to 25 cm glabrous. Leaves 3-foliolate, green, sometimes tinged purple or reddish; stipules ± 6 mm, laciniate; petiole ± 4 cm or shorter; leaflets 5–15 × 3–10 mm, minutely dentate, apex emarginate to retuse, base tapering, glabrous above, ± glabrous on the surface below and sparsely pilose on the midrib. Flowers yellow, 1(–2), in the axils of leaves; pedicel ± 1 mm. Calyx ± 2 mm, lobes ± 0.5 mm, sparsely pilose. Corolla with standard± 4 mm, the whole flower well exserted from the calyx. Upper filament free, the other 9 united. Pod spherical, 4–5 mm in diameter, 2–3-coiled with hooked spines, pale yellow when mature.

Flowering and fruiting: December to February.

Distribution and habitat: Northern Oman, in wadis and near cultivated land, in moist shaded locations, amongst grass and annuals herbs. *Altitude*: 1800–2000 m. Distributed in the Mediterranean region and Asia. Elsewhere in the Arabian Peninsula found in Saudi Arabia, ?UAE. Also found on Soqotra.

Distribution map: 398.

Notes: I have seen only a two specimens of this species from Oman, both collected from the Saiq plateau in the Jebel Akhdar range. It is not possible to identify them to one ofthe several varieties recognized within the species. The species is expected to occur at lower altitudes; but like many other annual legumes it is probably grazed as soon as the leaves come out or is undercollected.

26. **Melilotus** Mill.
About 25 species distributed mainly in the Mediterranean region and Central Asia.

Stipules entire; flowers white . . . . . .1. **M. alba**
Stipules dentate; flowers yellow . . . . . .2. **M. indica**

1. ***Melilotus alba*** Desr. in Lam., Encycl. Meth. 4:63 (1796).

Description: Annual herb, up to 50 cm; stems erect to ascending, glabrous. Leaves trifoliolate; stipules entire; leaflets 10–20 × 5–10 mm, obovate to oblong, serrate, apex acute, base tapering. Flowers white, in pedunculate axillary racemes; peduncle up to 4 cm. Calyx ± 2 mm. Corolla with standard ± 4 mm. Upper filament free, the other 9 united. Pod 3–5 mm, ovoid to subglobose, reticulately veined, glabrous.

Flowering and fruiting: February to March.

Distribution and habitat: Northern Oman, in wadis and irrigated land, as a weed. *Altitude*: 20–50 m. Distributed from NE Africa westwards through Arabia to Turkey and Europe; introduced in America and Australia; a weed of cultivated areas. Elsewhere in the Arabian Peninsula found in Qatar, Saudi Arabia, Yemen.

Distribution map & Illustration: 399.

Notes: Used as fodder for goats. The whole plant has been used in traditional medicine as an astringent and for treating rheumatic pain.

2. ***Melilotus indica*** (L.) All., Fl. Pedem. 1: 308 (1785).
Vernacular names: handagug, handaquq.

Description: Annual herb, up to 40 cm; stems unbranched, erect to ascending, pubescent. Leaves 3-foliolate; petiole 15–30 mm; stipules dentate; leaflets 8–22 × 3–12 mm, obovate to oblanceolate, dentate, apex obtuse to retuse, base tapering, glabrous above, ± glabrous beneath, pilose on the midrib below. Flowers yellow, in pedunculate axillary racemes; peduncle up to 3 cm. Calyx ± 2 mm. Corolla with standard 2–3 mm. Upper filament free, the other 9 united. Pod 1.5–4 mm, ovoid to subglobose, prominently reticulately veined, glabrous.

Flowering and fruiting: February to March.

Distribution and habitat: Northern Oman, in wadis and irrigated land, date gardens, farms, as a weed of cultivation. *Altitude*: 50–800 m. Distributed from Arabia westwards to Europe; introduced in many warm temperate areas. Elsewhere in the Arabian Peninsula found in Bahrain, Kuwait, Qatar, Saudi Arabia, UAE, Yemen. Also found on Soqotra.

Distribution map & Illustration: 400.

Notes: Used as fodder for goats.

27. **Trigonella** L.
About 70 species distributed in C and S Europe, and Mediterranean east to India, Far East and south in Africa to Zambia, Australia.

Flowers in pedunculate capitate racemes; pod 10–12 mm long . . . . . .1. **T. hamosa**
Flowers in ± sessile clusters; pod 2–3 mm . . . . . .2. **T. stellata**

1. ***Trigonella hamosa*** L., Syst. Ed. 10, 1180 (1795).
Vernacular names: getab (a term often used for a small herb in Central Oman).

Description: Annual herb; stems procumbent, trailing, up to 40 cm, glabrous to glabrescent. Leaves 3-foliolate, bright green; petiole up to 15 mm; stipules ± 2 mm, linear; leaflets 6–16 × 4–10 mm, obovate to oblong-obovate, crenate-dentate, apex rounded or frequently emarginate, dentate, base acute, ± pubescent to glabrous. Flowers yellow, ± 4 mm, in axillary capitate racemes, fragrant; peduncle up to 30 mm; pedicel 1–2 mm. Calyx ± 2 mm, lobes shorter than the tube, acute, sparsely pubescent to glabrous. Corolla with standard petal 3–4 mm. Pod 10–12 mm, flattened, curved upwards, beaked, ± glabrous, with prominent oblique and transverse ridges.

Flowering and fruiting: February to March.

Distribution and habitat: Northern Oman, including Musandam and southern Oman, Dhofar, in moist and damp locations, coastal cliffs, waste and cultivated land. *Altitude*: 20–50 m. Distributed from Egypt to Arabia, Turkey, and westwards to India. Elsewhere in the Arabian Peninsula found in Kuwait, Qatar, Saudi Arabia.

Distribution map & Illutration: 401.

2. ***Trigonella stellata*** Forssk., Fl. Aegypt.-Arab. 140 (1775).
Synonyms: *Trigonella monspeliaca* sensu Vahl 1791, non L.

Description: Small annual herb; stems prostrate to procumbent, up to 8 cm, glabrous to glabrescent. Leaves 3-foliolate, green; petiole up to 4 mm, slender; stipules ± 2 mm, somewhat sagitate; leaflets 3–5 × 3–5 mm, obovate, dentate, apex rounded, dentate, base acute, ± glabrous. Flowers yellow, ± 4 mm, in axillary sessile clusters. Calyx ± 2 mm, lobes shorter than the tube. Corolla with standard petal 3–4 mm. Pod 2–3 mm, slightly compressed, curved upwards, beaked, ± glabrous, with prominent transverse ridges, arising stellately from the leaf axils.

Flowering and fruiting: ?February to March.

Distribution and habitat: Northern Oman, in dry, waste or abandoned cultivated land. *Altitude*: ± 50 m. Distributed from N Africa westwards through Arabia to Iran, and eastwards to East Mediterranean. Elsewhere in the Arabian Peninsula found in Kuwait, Qatar, Saudi Arabia, ?UAE.

Distribution map & Illustration: 402.

Notes: The record is based on a single collection from Northern Oman, from Sinnah, [Sinnaw]. This is a very small plant, whereas the species in its range of distribution is bigger with stems up to 35 cm, leaves up to 8 cm long, and pods up to 8 mm long.

Cultivated species

Trigonella foenum-graecum L. (1753).
Vernacular names: halbah, helbah, hulbah. Common English name: fenugreek.
Annual herb, up to 30 cm; stems erect; leaflets aromatic, 10–30× 5–15 mm, obovate to oblong, dentate at the apex. Flowers white or cream, 5–15 mm, solitary or paired in the axils of leaves. Pods erect, 6–10 cm long, straight or curved, somewhat flattened, tapering to a beak. Distributed in SW Asia, southern Europe and Ethiopia, it is cultivated throughout Arabia; rarely found as an escape. The entire plant is regarded highly for its medicinal properties; it used for the treatment of abdominal colic, bronchitis and cough, sprains and treatment after childbirth when it is considered to give strength and 'clean the stomach'. Powdered seeds, mixed with meat broth and vegetables are used in soups, especially in Yemen, where it is believed to enhance appetite and discourage constipation. The plant is also placed amongst clothes as an insect repellent.

28. **Hippocrepis** L.

About 21 species distributed in Europe and the Mediterranean east to Tukmenistan and south to Cape Verde, Mali, Sudan and Arabia.

Flowers in pedunculate heads; pod up to 6-segmented, segments separating at maturity ..... 1. **H. constricta**
Flowers 1–2, in the axils of leaves; pod 4–12-segmented, segments not separating at maturity ..... 2. **H. unisiliqua**

1. ***Hippocrepis constricta*** Kuntze, Linn. 16: 320 (1842).
Vernacular names: (al) baqoliyan.

Description: Annual herb up to 10 cm; stems prostrate to ascending. Leaves imparipinnate with 2–3 pairs of leaflets; leaflets 4–5× 0.5–1 mm, oblong, apex truncate or retuse. Flowers sessile, in pedunculate heads; peduncles 18–20 mm. Calyx 2–3 mm, white-pubescent, persistent. Corolla with standard petal and wings yellow, keel turning upwards. Pod flattened, 25–30 mm, up to 6-segmented, segments separating at maturity.

Flowering and fruiting: February to March.

Distribution and habitat: Northern Oman, Musandam, in sandy depressions and wadi flows. *Altitude*: ±200. Distributed in Egypt, S Arabia, Pakistan. Elsewhere in the Arabian Peninsula found in Saudi Arabia.

Distribution map & Illustration: 403.

Notes: Recorded only from Musandam; probably undercollected. Grazed by goats and camels.

2. ***Hippocrepis unisiliquosa*** L., Sp. Pl. 744 (1753)
subsp. ***bisiliqua*** (Forssk.) Bornm., Notizbl. Bot. Gart. Berlin 10: 438 (1928).
Synonyms: *Hippocrepus bisiliqua* Forssk. (1775).

Description: Annual herb up to 20 cm; stems ascending to ± prostrate, glabrous. Leaves imparipinnate with 4–5 pairs of leaflets; leaflets 5–16 × 3–4 mm, obovate, apex truncate or retuse; glabrous, pale green. Flowers sessile or subsessile, solitary or 2 in leaf axils. Calyx 2–3 mm, lobes linear-lanceolate, white-pubescent, persistent. Corolla with standard 4–5 mm, yellow, wings yellow, keel turning upwards. Pod flattened, 30–40 mm, 4–12-segmented, sparsely pubescent and pubescent along the margins, bright green, segments not separating into joints at maturity.

Flowering and fruiting: February to March, after rain.

Distribution and habitat: Northern Oman, Musandam, in moist sandy places and sandy wadi banks; expected to occur on the Jebel Akhdar. *Altitude*: 100–200 m. Distributed in Iran, Cyprus, Egypt. Elsewhere in the Arabian Peninsula found in Bahrain, Kuwait, Qatar, Saudi Arabia, UAE.

Distribution map & Illustration: 404.

Notes: Grazed by goats and camels.

Species expected to occur in Oman

Hippocrepis areolata Desv.
Synonyms: *Hippocrepis bicontorta* Lois.

Description: Delicate annual herb up to 10 cm. Pod with very divided segments.
Notes: The species is found in Bahrain, Kuwait, Qatar, Saudi Arabia, UAE, and is expected to occur in Oman. It is perhaps overlooked.

29. **Vicia** L.
About 140 species distributed in the north temperate regions south to Zambia and Malawi, to India, Chile and Argentina, and Hawaiian Islands.

Vicia sativa L., Sp. Pl. 736 (1753).

Description: Annual herb; stems ascending, trailing, up to 50 cm, downy when young, glabrescent. Leaves paripinnate, rachis ending in a branched tendril; petiole up to 10 mm; stipules 3.5–6 mm, triangular, dentate; leaflets 6–15 × 2–6 mm, oblong to oblong-ovate, entire, apex obtuse or emarginate, apiculate, base acute. Flowers 1–2, dark purple, ± sessile, in the axils of leaves. Calyx 10–12 mm, tube slightly gibbous above, lobes subequal, linear, acute, villous. Corolla with standard petal ± 18 mm, ovate, narrowing to a claw. Upper free, the other 9

united. Pod flattened, 30–60 × 8–10 mm, linear-oblong, beaked, ± glabrous, valves twisting after dehiscence.

Flowering and fruiting: February to March.

Distribution and habitat: Northern Oman, on the western Hajar mountains, in orchards and lime-gardens. *Altitude*: 950–2000 m. Distributed in the tropical and temperate regions of the world. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map & Illustration: 405.

Notes: *Vicia faba* L. is recorded to be cultivated in Oman. I have seen only a single specimen from Khasab, Musandam, from a date orchard. Being an annual probably overlooked and undercollected.

Cultivated species

Clitoria ternatea L. (1753).
Climbing or trailing shrub. Leaflets 5–7, 1–6 × 1–4 cm, oblong to ± rotund. Flowers blue (in Oman), 1–2 in the axils of leaves. Calyx 15–20 mm. Corolla with a large standard petal, 3–5 cm. Pod 6–10 cm, glabrous to sparsely pubescent. Cultivated widely throughout Oman, especially in northern Oman. Not naturalized and not found as an escape.

Leucaena leucocephala (Lam.) de Wit (1961).
Synonyms: *Leucaena glauca* Benth.
Tree to 10 m, with yellow heads of flowers and pods. Commonly cultivated throughout Oman for its fast growth. Rarely found as an escape.

45. Lythraceae

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Key to the genera of Lythraceae in Oman

1. Annual or perennial herbs; flowers in axillary cymes or glomerules; petals minute, falling soon; hypanthium ± membranous in fruit . . . . . .3. **Ammannia**
1. Shrubs or trees; flowers in terminal panicles or few-flowered cymes; petals not minute; hypanthium not membranous in fruit
   2. Leaves black-dotted; flowers 6-merous, red, somewhat fleshy; stamens 12, inserted below the middle of the hypanthium . . . . . .1. **Woodfordia**

2. Leaves not black-dotted; flowers 4-merous, white, not fleshy; stamens 8, inserted at the top of the hypanthium ..... 2. **Lawsonia**

1. **Woodfordia** Salisb.
2 species, one from Ethiopia, Kenya west to Nigeria and the other from Madagascar to China.

Woodfordia uniflora (A.Rich.) Koehne in Engler's, Bot. Jahrb. 1: 333 (1881).
Basionym: *Grislea uniflora* A.Rich. (1847).
Synonyms: *Grislea multiflora* A.Rich. (1847); *Woodfordia floribunda* Salisb. var. *glabrata* Hiern (1871); *Woodfordia floribunda* Salisb. var. *tomentosa*; *W. fruticosa* sensu Collenette, *Flora of Saudi Arabia* (1985), non (L.) Kurz fide S.A. Graham.
Vernacular names: ṭob (Ẓufari Arabic, Jibbālī).

Description: Small tree, often shrubby, up to 2 m, with a flaky bark and young stems reddish to orange- brown. Leaves opposite and decussate, sessile to shortly petiolate, 3–9 × 0.8–2 cm, ovate to elliptic- ovate, apex acute, base rounded, sparsely pubescent above, with conspicuous black to crimson glands on the undersurface. Inflorescence of short axillary cymes. Flowers slightly zygomorphic, red, 6-merous, shortly pedicellate. Calyx 10–11 mm, tubular, 6-lobed, scarlet-red, pubescent on the outer surface. Petals 6 or absent, white or red, inserted in between on the calyx lobes. Stamens 12, filaments pinkish, inserted a third up on the calyx-tube; anthers dark red, exserted. Capsule 12–13 mm, elliptic, pilose, many-seeded.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, in the wet escarpment mountains, on slopes and rocky wadis, with *Anogeissus*, *Euclea*, *Ruttya*, and other woodland species. *Altitude*: 250–650 m. Distributed from Kenya, Uganda west to Nigeria, Ethiopia to southern Arabia. Elsewhere in the Arabian Peninsula found in Saudi Arabia (cited as *W. multiflora*), Yemen.

Distribution map & Illustration: 406.

Notes: The difference between this species and *Woodfordia fruticosa* appears to be the larger, densely puberulous leaves and dense axillary flower clusters in the latter. Radcliffe-Smith 5321 (K) a sterile specimen from Sarfait, Dhofar, has leaves that are ± 11× 3 cm, similar in size to the material seen from Ethiopia.

Traditionally the shoots and wood were used to tan leather.

2. **Lawsonia** L.
Monotypic; distributed throughout Africa and Asia.

Lawsonia inermis L., Sp. Pl. 349 (1753).
Synonyms: *Lawsonia alba* Lam. (1789) nom. illegit.; *L. spinosa* L. (1753).
Vernacular names: ḥenna, ḥinna, ḥine (also Ẓufari Arabic, Jibbālī).

Description: Shrub or small tree, up to 3 m, glabrous; branches sometimes ending in spines. Leaves opposite, almost sessile, 15–35× 5–13 mm, elliptic to oblanceolate, apex acute base tapering. Flowers 4- merous, white to yellow-white, in dense panicles present at the ends of branches, fragrant. Calyx 2–2.5 mm, ovate. Petals ± 4 mm, wrinkled, reflexed when flower is fully open. Capsule globose, 5–7 mm in diameter, 1–4-locular, brown when mature with many small seeds.

Flowering and fruiting: September to November.

Distribution and habitat: Throughout Oman, in disturbed and waste places, often by villages, cultivated and often naturalized. Throughout the Old World tropics and Australia; introduced to the New World tropics. *Altitude*: 0–2000 m. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen, but cultivated throughout the Arabian Peninsula.

Distribution map & Illustration: 407.

Notes: The leaves yields a red dye which is used throughout Arabia as hair colour and as a stain to dye hands and feet. Palms and backs of hands, and soles of feet are dyed in intricate patterns for most festivities such as Eīd ul fitr (celebrations after Ramaḍan, a month of fasting in the Islamic lunar calendar), Eīd al Adha (celebrations at Hajj, the pilgrimage to Mecca performed by Muslims) and at weddings and birthdays. The leaves are also used for fevers, chewed as a local anaesthetic, as an anti-inflammatory, and for treating mouth ulcers. An informative account of the history and folklore of hinna is given by M.A. Miczak (2001) in her book *Henna's Secret History* (publ. Writers Club Press).

Wild-collected seed of this species is held at the Millennium Seed Bank at Wakehurst Place, Royal Botanic Gardens, Kew.

3. **Ammannia** L.

About 30 species of moist habitats, cosmopolitan in distribution.

Flowers pedicellate, in axillary cymes ..... 1. **A. auriculata**
Flowers sessile, in axillary glomerules ..... 2. **A. baccifera**

1. ***Ammannia auriculata*** Willd., Enum. Pl. Hort. Berol. 1: tab. 7 (1803).

Description: Annual herb, up to 40 cm. Stems erect to decumbent, slightly woody towards the base, branched, glabrous. Leaves 7–30 × 3–8 mm, lanceolate to elliptic or linear-lanceolate or linear-oblong, apex acute, base cordate to auriculate; leaves reducing in size upwards. Flowers red, in few-flowered cymes, peduncle 2–10 mm; pedicels 2–3 mm, filiform. Hypanthium cup-shaped, ± 2 mm, including calyx-lobes; lobes triangular, acuminate, puberulent; sinus horns distinct in bud. Petals obovate, minute, ± 0.5 mm, pinky-white. Stamens 4–8. Ovary globose, 1.5–2 mm in diameter, style equalling the stamens. Capsule globose, ± 2.5 mm in diameter, papery, translucent, reddish brown, dehiscing irregularly.

Flowering and fruiting: February to April; September to October.

Distribution and habitat: Southern Oman, Dhofar, in wet woodlands and wadis, in shady and moist places, by streams at edges of permanent water pools. *Altitude*: 250-400 m. Distributed in Asia, tropical and subtropical Africa, southern Arabia. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen. Also found on Soqotra.

Distribution map: 408.

Notes: A polymorphic species. Our plants possibly fall under var. *bojeriana* Koehne (op. cit. 46).

2. ***Ammannia baccifera*** L., Sp. Pl. 120 (1753).

Description: Annual herb, up to 80 cm. Stems erect to ascending, unbranched, reddish, glabrous. Leaves 9–35 × 3–6 mm, oblanceolate to oblong-lanceolate, sessile, often drooping, apex acute, base rounded to subcordate. Flowers reddish green, in sessile or subsessile cymose

clusters (glomerules), in the axils of leaves throughout the length of the stem; peduncles ± 1 mm. Hypanthium cup-shaped, ± 1 mm, including calyx-lobes; lobes triangular; sinus horns obscure. Petals absent or rarely present then minute. Stamens 4, included in the sepals. Ovary globose, ± 1.5 mm in diameter, style ± equalling the stamens. Capsule globose, ± 2 mm in diameter, somewhat fleshy, reddish brown, dehiscing irregularly.

Flowering and fruiting: January to April.

Distribution and habitat: Northern and southern Oman, in shady and moist places, often near water. *Altitude*: 50–1700 m. Distributed in Africa, SW Asia, the Far East, Australia. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen. Also found on Soqotra.

Distribution map: 409.

Notes: Noted to be grazed by donkeys.

46. Thymelaeaceae

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Key to the genera of Thymelaeaceae in Oman

1. Annual herbs; leaves 10 mm long or less; flowers in axillary clusters greenish yellow ..... 1. **Thymelaea**
1. Shrubs; leaves more than 10 mm long; flowers in terminal clusters, white or yellow
   2. Flowers white or greenish-yellow, in capitate racemes, not surrounded by bracts ..... 2. **Daphne**
   2. Flowers yellow, in terminal heads, surrounded by bracts ..... 3. **Gnidia**

1. **Thymelaea** Mill. (nom. conserv.)
Ligia Fasano

30 species distributed in C Europe and the Mediterranean to C Asia, W Siberia and NW India.

Thymelaea mesopotamica (C. Jeffrey) Peterson, in Rech. f., Fl. Iran. 95: 8 (1972).
Basionym: *Ligia mesopotamica* C. Jeffrey (1969).

Description: Annual herb, unbranched or with a few branches above, up to 25 cm, sparsely to densely pilose. Leaves alternate, sessile, grey-green, 6–10 × 1–1.5 mm, lanceolate to linear-lanceolate, apex acute with the midrib extending beyond the tip into a mucro, base tapering, pilose. Flowers greenish-yellow, female and bisexual, sessile in 2–3-flowered axillary clusters, enclosed by 2 lanceolate bracts. Receptacle tube 2.5–3 mm, pilose. Calyx lobes ovate. Petals absent. Anthers sessile. Fruit (nut) subglobose, ± 1 mm, black, the receptacle tube somewhat adhering to the fruit and not easily removed.

Flowering and fruiting: March.

Distribution and habitat: Northern Oman, Musandam, on the mountains and expected to occur on the western Hajar. *Altitude*: ± 1000 m. Distributed from Syria to Turkey, Iraq and Iran. Elsewhere in the Arabian Peninsula found in Bahrain, Kuwait, Saudi Arabia. Expected to be present in the mountains in the UAE.

Distribution map: 410.

Notes: Recorded only from the Musandam mountains where it is apparently rare, but being an annual is probably undercollected.

2. **Daphne** L.

About 70 species, distributed in the Old World, mainly temperate and subtropical Europe and Asia and extending to Australia and the Pacific.

Daphne mucronata Royle, Illlustr. Bot. Himal. 232, t. 81, f. 2 (1836).
Synonyms: *Daphne angustifolia* C. Koch. (1849); *D. acuminata* Stocks (1852) & Boiss. (1879).
Vernacular names: bakhtīt, lizkam, mithnān.

Description: Shrub to 2 m; bark reddish-brown in younger stems, whitish and longitudinally fissured in older stems and branches, glabrescent. Leaves alternate, sessile, 22–35 × 4–5 mm, lanceolate-elliptic to linear-lanceolate, apex mucronate, base tapering, margins entire, grey-green, glabrous. Flowers white to greenish-yellow, fragrant, in terminal capitate racemes, shortly pedicellate with pedicel, inflorescence axis and receptacle tube densely white-tomentose. Receptacle tube 6–7 mm. Calyx 4-lobed, densely tomentose on the outside. Petals absent. Stamens 4. Ovary sericeous; stigma capitate. Drupe 7–8 mm, subglobose, sericeous, orange-red.

Flowering and fruiting: July to September.

Distribution and habitat: Northern Oman, on the Hajar mountains, on open rocky ground and rocky slopes, with *Juniperus*, *Berberis* and *Lonicera* on the western Hajar, and with *Prunus*, *Ziziphus* and *Ceratonia* on the eastern Hajar (Jebel Bani Jabir). *Altitude*: 1900–3000 m. Distributed in Jordan, Turkey through Transcaucasia, and from Iraq to NW India. Elsewhere in the Arabian Peninsula found in Saudi Arabia.

Distribution and habitat: Northern Oman, on the mountains where it has been introduced, and often cultivated. It is naturalized at a few locations on Jebel Akdar, but always found near villages. *Altitude*: 50–1200 m. A southern European species distributed and cultivated in many temperate and warm countries and Arabia.

Distribution map & Illustration: 411.

Notes:. The leaves have been used in traditional medicine for treating abdominal colic, coughs, fevers and headache, nosebleeds and applied on blisters, stings and ulcers. Also used as an insecticide placed amongst clothing to protect against moths, etc.

3. **Gnidia** L.

Lasiosiphon Fres.

140 species distributed from tropical Africa to South Africa, Arabia, S & W India, Sri Lanka and Madagascar.

Gnidia somalensis (Franch.) Gilg., Ann. Ist. Bot. Roma vi, 98 (1896).
Basionym: *Arthrosolen spherocephalus* Franch. (1882).

Synonyms: *Lasiosiphon somalensis* (Franch.) Pearson (1910).

Description: Low shrub to 80 cm; branching from the base, very sparsely pilose. Leaves alternate, sessile to subsessile, grey-green, 13–25 × 2–4 mm, linear-lanceolate, entire, apex acute to mucronate, base tapering, glabrous. Flowers yellow, in terminal heads up to 2 cm across; bracts 12–14 mm, ovate, acuminate. Receptacle tube densely white sericeous, ± 4 mm. Calyx with a long tube 4–5 mm, with long sericeous hairs, lobes ± 1.5 mm, glabrous within. Petals absent. Fruit not seen.

Flowering and fruiting: ?September, October.

Distribution and habitat: Southern Oman, Dhofar. *Altitude*: ± 150 m. Distributed in NE Africa (Somalia, Ethiopia). Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map & Illustration: 412.

Notes: Uncommon and localised in Dhofar. The name of this species is based on a specimen collected from Hadramaut, Yemen by W. Lunt 219 (holotype K).

47. Myrtaceae

Myrtus L.
2 species, distributed in the Mediterranean and N Africa.

Myrtus communis L., Sp. Pl.: 471 (1753).
Vernacular names: hadās, ās, yās. Common English name: myrtle.

Description: Evergreen shrub, up to 2 m. Leaves opposite, 15–25 × 7–5 mm, ovate to elliptic, apex acute, base tapering, bright green and glossy, aromatic when crushed; petiole ± 2 mm. Flowers white, ± 20 mm across, solitary to few in axillary cymes. Bracteoles 2, linear. Calyx 2–3 mm. Corolla white, about 3× the length of sepals, concave. Stamens exserted. Petals and sepals reflexed when flower fully open. Berries 7–10 mm, ovoid, red, ripening blue-black, crowned with the persistent calyx lobes.

Flowering and fruiting: February to May.

Distribution and habitat: Northern Oman, on the mountains where it has been introduced, and often cultivated. It is naturalized at a few locations on Jebel Akdar, but always found near villages. *Altitude*: 50–1200 m. A southern European species distributed and cultivated in many temperate and warm countries and Arabia.

Distribution map & Illustration: 413.

Notes: The leaves have been used in traditional medicine for treating abdominal colic, coughs, fevers and headache, nosebleeds and applied on blisters, stings and ulcers. Also used as an insecticide placed amongst clothing to protect against moths, etc.

48. Combretaceae

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Anogeissus L.

8 species, distributed from Thailand through India and Arabia to tropical Africa.

Anogeissus dhofarica A.J.Scott, Kew Bull. 33: 559 (1979).

Type: Oman, Jebel Qara, Dhofar, 1 Oct. 1943, Vesey-Fitzgerald 12358 (holotype BM, isotype K).

Vernacular names: meşţeh, misţeh, shghot (Jibbālī), miseţ (Ẓufari Arabic).

Description: Deciduous tree, up to 10 m, with a grey-brown fissured bark and a rounded crown; young branches reddish, puberulous. Leaves opposite to subopposite, bluish-green, 15–55 ×7–30 mm, elliptic to obovate, apex acute, base attenuating into a short petiole 3–4 mm, leaves with sparse pubescence becoming glabrous. Flowers in dense globose heads ± 1.5 cm across, terminal on lateral branches, peduncles 2–3 cm. Calyx ± 3.5 mm, tubular, expanded above to form a shallowly 5-lobed cup. Petals absent. Stamens 10, exserted. Ovary inferior. Fruits many, forming small subglobose cones, 1.5–2.5 cm in diameter, yellow-brown, each fruit 7–10 mm, with 2 wings and a single median beak, 1-seeded.

Flowering and fruiting: August to September.

Distribution and habitat: Southern Oman, Dhofar on the slopes of the escarpment mountains, dominant and frequently forming monospecific stands. *Altitude*: 300–800 m. A regional endemic, found in the Mahra region (SE Yemen) in Hauf, and as outlier on Ras Fartak (SE Yemen).

Distribution map & Illustration: 414.

Notes: An important woodland tree of the escarpment mountains, coming into leaf after the monsoons. Browsed by livestock and to some extent under stress from over-grazing, especially near water-holes where the trees are severely damaged. Wood has been used as building material.

Wild-collected seed of this species is held at the Millennium Seed Bank at Wakehurst Place, Royal Botanic Gardens, Kew.

Cultivated species

Conocarpus lancifolius Engl. & Diels (1900).

Tall fast growing tree up to 3 or 4 m with clusters of yellow-green flowers. The species is salt and drought tolerant, therefore planted in the Capital area where it gorws very well. Not commonly planted elsewhere in the country.

Terminalia catappa L. (1753).

Vernacular name: bedām.

A large tree up to 20 m with characteristic horizontal branches and white flowers in catkins. Fruits with edible nuts. Not common in northern Oman, but planted more frequently in Dhofar.

49. Santalaceae

Bibliography

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Osyris L.

About 7 species distributed in Macaronesia, Mediterranean region, Arabia to Japan and Malaysia, Ethiopia to South Africa.

Osyris sp. A.

Description: Shrub to 1 m with glabrous stems. Leaves leathery, alternate, (15–)22–50 × (5–)8–12 mm, lanceolate, entire, apex acute to mucronate, base tapering into short petiole ± 3mm, or leaf-base sessile. Flowers in axillary panicles. Fruit ± 7 × 6 mm, subglobose, red (not seen in Oman plants).

Flowering and fruiting: ?September to October.

Distribution and habitat: Southern Oman, Dhofar, in the drier areas. *Altitude*: ?± 1500 m.

Distribution map: 415.

Notes: There is only a single collection of this species from Oman from the border area between Oman and Yemen; it is also recorded from the Hauf region in eastern Yemen. The Yemen plants belong to *O. lanceolata* Hochst. & Steud. in DC., but according to Kilian et al. (op. cit.) this species is distinct in being a small shrub with smaller leaves and is densely puberulous. They found this species in the Hauf mountains not far from the border with Oman.

50. Loranthaceae

Bibliography

Miller, A.G. & Morris, M. (1988). *Plants of Dhofar, the Southern Region of Oman, Traditional, Economic and Medicinal uses*, pp. 188–189. The Office of the Adviser for Conservation of the Environment, Diwan of Royal Court, Sultanate of Oman.

Polhill, R. & Wiens, D. (1998). *Mistletoes of Africa*. Royal Botanic Gardens, Kew.

Key to the genera of Loranthaceae in Oman

Flowers bright-red; corolla lobes becoming reflexed and twisted . . . . . .1. **Plicosepalus**
Flowers yellow; corolla lobes remaining erect . . . . . .2. **Onocalyx**

1. **Plicosepalus** Tiegh.

12 species distributed from the Middle East and Arabia, and from eastern Africa to Angola and South Africa.

Plicosepalus acaciae (Zucc.) Wiens & Polh., Nord. J. Bot. 5: 221 (1985).
Basionym: *Loranthus acaciae* Zucc. (1840).
Vernacular names: dhódho', oşodot, ţodi, ţodo' (Jibbālī).

Description: Semi-parasitic epiphytic shrub, up to 1 m. Leaves opposite to subopposite, 7–40 × 2–20 mm, broadly oblong to oblanceolate to oblong-ovate, apex rounded, base rounded, margin entire, glabrous, obscurely 3–5-nerved; petiole ± 5 mm. Flowers 1–2, in the axils of leaves; peduncle 0–5 mm; pedicel 3–6 mm. Receptacle urceolate, 3–5 mm. Calyx cupular, tending to split. Corolla bright-red, 5-lobed, lobes fused below into a tube ± 8 mm long, with 4–5 paired folds inside; lobes 20–30 mm, linear, with a small protuberance near the base, becoming reflexed and twisting. Stamens 5, attached to the corolla lobes, straight or incurving slightly at anthesis. Ovary inferior. Fruit (berry) 5–7 × 10–12 mm, ovoid, bright-scarlet red, glossy, crowned by the calyx, sticky when mature.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, in the drier areas, in the *Acacia-Commiphora* shrubland, recorded on *Acacia tortilis* and *Ziziphus leucodermis*. *Altitude*: 250–550 m. Distributed in N and NE Africa (Ethiopia, Sudan, Egypt) and Palestine. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map & Illustration: 416.

Notes: A semi-parasitic shrub, distinguished from the other epiphytic semi-parasite found in Dhofar by its red flowers. This and the next species have been used traditionally for tanning leather.

2. **Oncocalyx** Tiegh.
13 species distributed from southern Africa to Arabia.

Oncocalyx schimperi (Hoschst. ex A.Rich.) M.G.Gilbert, Nord. J. Bot. 5: 222 (1985).
Basionym: *Loranthus schimperi* Hoschst. in Rich. (1847).
Vernacular names: dhódho', oşodot, ţodi, ţodo' (Jibbālī).

Description: Semi-parasitic epiphytic shrub, up to 1 m. Leaves opposite to subopposite, often clustered on short lateral branches, 15–40 × 10–25 mm, narrow broadly-oblong to ovate or broadly elliptic to almost rounded, apex acute to rounded, base tapering into the petiole, margin entire, puberulous, becoming glabrous, 3–5-veined; petiole ± 5 mm. Inflorescence of few-flowered axillary umbels; pedicel 1–3 mm; bracts tubular, 2–4 mm. Receptacle ± 1.5 mm. Calyx tubular, 3–6 mm, truncate or slightly lobed ciliate. Corolla yellow, 5-lobed, opening by a slit to the calyx; lobes 13–30 mm, linear, erect. Stamens 5, attached to the corolla lobes, incurved at anthesis. Ovary inferior. Fruit (berry) ± 7 × 4 mm, ovoid, crowned by the calyx, sticky when mature.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, on the dry slopes and wadis of the escarpment mountains in the *Acacia-Commiphora* shrubland; recorded on *Boscia arabica*, *Maerua crassifolia*, *Euclea racemosa* subsp. *schimperi*, *Salvadora persica*, *Olea europaea*, *Moringa peregrina* and *Tamarix* spp. *Altitude*: 500–750 m. Distributed in Djibouti, Ethiopia, Somalia. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map: 417.

51. Hydnoraceae

Bibliography

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Beentje, H. & Luke, Q. (2002). Hydnoraceae. In: *Flora of Tropical East Africa* (eds H.J. Beentje & S.A. Ghazanfar). A.A. Balkema Publishers, The Netherlands.

Hydnora Thunb.

12 species distributed from Arabia and Ethiopia to South Africa and Madagascar.

Hydnora abyssinica A.Braun in Schweinf., Beitr. Fl. Aethiop.: 217 (1867).

Synonyms: *Hydnora johannis* Becc. (1871); *H. africana* sensu auctt. Milller & Morris (1988), Musselman in Fl. Somalia (1993).

Vernacular names: khamlayyeh, khumla'ah (Ẓufari Arabic), khamleg (Jibbālī)).

Description: Parasitic herb, with a subterranean stem, lacking leaves and roots. Stem creeping ± 1.5 cm in diameter, covered with warty tubercles, attached to roots of *Acacia* trees (in Dhofar). Flowers bisexual, solitary, 4-merous, appearing above the ground, unpleasant to smell. Perianth fleshy red, covered with bristly hairs, tubular below with 4 lobes above, tube ± 6 cm, lobes thick and fleshy, lobes 5–6 cm, oblong, hooded at the tips, spreading or remaining connate at the tips and opening by lateral slits; lobes with a white spongy tip. Stamens inserted in the perianth tube; anthers v-shaped, sessile, divided into many parallel locules. Ovary inferior, subterranean. Fruit 4–12 × 5–12 cm, subglobose, thick-walled, ripening below the ground, many-seeded.

Flowering and fruiting: After heavy rains, mainly April.

Distribution and habitat: Southern Oman, Dhofar, in the drier areas and sandy wadis, dry river beds, parasitic on the roots of *Acacia tortilis*. *Altitude*:100–1500 m. Distributed in tropical east Africa. Not found elsewhere in the Arabian Peninsula.

Distribution map & Illustration: 418.

Notes: The flowers push their way above ground usually at night, and last for just one day. The flowers and fruits are edible, especially the fruits, which are sweet and regarded as a special treat by local inhabitants.

I have not seen this species in the wild either in flower or fruit; the description is largely taken from Miller & Morris (op. cit.).

52. Celastraceae

Bibliography

Miller, A. G. & Morris, M. M. (1988). *Plants of Dhofar, the southern region of Oman, traditional, economic and medicinal uses*, pp. 102–103, 309. The Office of the Adviser for Conservation of the Environment, Diwan of Royal Court, Sultanate of Oman.

Maytenus L.

About 200 species distributed in the warmer regions of the world.

Leaves oblanceolate; capsule ± 3× 5 mm, ovate, splitting predominantly by 2 valves . . . . . 1. **M. senegalensis**
Leaves elliptic to ovate to broadly ovate; capsule 6–8× 8–9 mm, triangular, splitting predominantly by 3 valves . . . . . 2. **M. dhofarensis**

1. ***Maytenus senegalensis*** (Lam.) Exell, Bol. Soc. Brot., ser 2, 26: 223 (1952).
Basionym: *Celastrus senegalensis* Lam. (1785).
Vernacular names: serbiţ, serbidh, sherbidh, sherbīdh (Ẓufari Arabic, Jibbālī).

Description: Shrub, up to 1.5 m; lateral branches becoming spiny at the tips, grey-brown, scruffy, spines up to 3 cm, grey-brown with reddish-brown tips. Leaves alternate or in fascicles on spiny shoots, grey-green, 1–5 × 0.5–1 cm, oblanceolate, apex obtuse with a small mucro at the tip, base cuneate, margin obscurely crenate to entire, glabrous. Flowers functionally unisexual, rarely bisexual, in delicate cymes, white, ± 1 cm across; pedicel 2–3 mm. Calyx ± 1 mm. Corolla ± 1 mm. Stamens (4–)5, inserted at the base of a disc, in the female flowers reduced to staminodes. Capsule red-purple, 3 × 5 mm, ovate, glabrous, splitting by 2(–3) valves. Seeds with a white (turning purple) aril at the base.

Flowering and fruiting: September to February.

Distribution and habitat: Southern Oman, Dhofar, in the drier areas along the coast eastwards to Sahil al Jazir, exposed limestone areas, dry wadi sides, with *Acacia tortilis*, *Boswellia*, *Lavandula basikensis*, *Ziziphus leucodermis*. *Altitude*: 20–950 m. Distributed throughout Africa, eastwards through SE Arabia to Afghanistan and to India. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map & Illustration: 419.

2. ***Maytenus dhofarensis*** Sebsebe, Symb. Bot. Uppsala 25, 2: 71 (1985).
Type: Oman, Jebel Qara, Wadi Ayn Arzat, ± 200 m, 23 Sept. 1979, A.G. Miller 2150 (holotype E, isotype K).
Vernacular names: serbiţ, serbidh, sherbidh, sherbīdh (Ẓufari Arabic, Jibbālī).

Description: Shrub or small tree, up to 3 m; branches and stems spiny with spines up to 3 cm, grey-brown. Leaves alternate or in fascicles on short shoots, grey-green, 1–5 × 0.5–3 cm, elliptic to ovate to broadly ovate, apex acute to obtuse to retuse, base cuneate, margin obscurely crenate to entire, glabrous. Flowers functionally unisexual or bisexual, in delicate cymes, white, ± 1 cm across, mildly fragrant; pedicel ± 3 mm. Calyx (4–)5, ± 1 mm. Corolla 1.5–2 mm, free. Stamens (4–)5, inserted at the base of a disc, in the female flowers reduced to staminodes. Capsule red-purple, 6–8× 8–9 mm, broadly oblong to triangular, glabrous, splitting by (2–)3 valves. Seeds with a white (turning purple) aril at the base.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, on the escarpment mountains and extending to the drier summit plateau and coastal plains. *Altitude*: 50–1000 m. A regional endemic, also found in SE Yemen.

Distribution map & Illustration: 420.

Notes: Relatively common, but so heavily grazed by livestock at certain locations, that flowers and fruit are rarely seen (as observed in September 2002). Cut spiny branches are used as enclosures for livestock.

53. **Salvadoraceae** (by A. Patzelt)

Bibliography

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Key to the genera of Salvadoraceae in Oman

Shrubs, armed with axillary spines ..... 1. **Azima**
Shrubs, unarmed ..... 2. **Salvadora**

1. **Azima** Lam.

About 4 species distributed from South and tropical Africa and Madagascar to India, Malaysia and the Philippines.

Azima tetracantha Lam., Encycl. 1: 343 (1783).
Vernacular name: dhīshi (Ẓufari Arabic, Jibbālī), ţisi.

Description: Spiny, evergreen shrub, up to 3 m tall, dioecious, bark yellowish-grey. Stems much branched, glabrous. Leaves opposite, petiolate, yellowish-green; petiole 2–5 mm; lamina 2–4 × 0.75–2 cm, elliptic to ovate, apex mucronate, base cuneate, margin entire; spines usually arranged in the axils of each leaf, often appearing in whorls of four, up to 4 cm long, straight. Flowers small, cream or yellow-green in small axillary clusters or spikes, sessile, often running into interrupted spikes at the ends of the twigs. Calyx ± 2 mm, 4-lobed. Petals 4, free, reflexed. Male flowers with 4 stamens; female flowers with a 2-locular ovary; stigma sessile, bi-lobed, hairy. Fruit (berry), 6–8 mm in diameter, globose, translucent white when mature, 1–2- seeded. Seeds discoidal, black.

Flowering and fruiting: April to October.

Distribution and habitat: Southern Oman, on the dry northern slopes of the Dhofar mountains (Jebel Qara and Jebel Samhan) in dry scrub with *Euphorbia balsamifera* and *Commiphora* spp.; rarely found in the upper parts of the wet woodlands. *Altitude*: 130–700 m. Distributed from SE Asia and India to tropical and southern Africa. Not found elsewhere in the Arabian Peninsula.

Distribution map & Illustration: 421.

Notes: This species is not common in Oman and occurs only at a few locations on the eastern Dhofar mountains at low and middle altitude ranges. Shoots of *Azima tetracantha* that are without spines are often difficult to distinguish from *Salvadora persica* in herbarium material. The species is in cultivation at the National Botanical Garden, Sultan Qaboos University, Oman.

2. **Salvadora** L.

About 4 species distributed in the drier areas from Africa and Arabia to India and China.

Salvadora persica L., Sp. Pl. 122 (1753).
Vernacular name: arāk, miswāk, rāk, rākah; yeherēk (Harsūsī); eherik (Jibbālī).

Description: Evergreen shrub or small tree, glabrous. Stems scrambling, grey or whitish, often forming tangled thickets, up to 2 m high and 6(–10) m across. Leaves opposite, petiolate, pale green, slightly succulent, with thick and leathery; petiole 0.5–1 cm long; lamina 1.5–6 × 1–4 cm, elliptic to ovate, apex acute and sometimes mucronate, base narrow or rounded, margin entire. Flowers small, greenish-white, in numerous terminal and lateral panicles, up to 10 cm long. Calyx 4-lobed, ± 0.75 mm. Corolla 4-lobed, 1.5–2 mm. Ovary 1-locular; stigma sessile. Fruit (drupe) globose, 2–7 mm in diameter, white and translucent at first, turning to red or dark purple when ripe, 1-seeded.

Flowering and fruiting: Throughout the year, flowers and berries usually occurring at the same time.

Distribution and habitat: Throughout Oman, in coastal wadis and plains, mostly on saline, sandy or loamy soils; common; rarely found in sand deserts. *Altitude*: 20–650 m. Distributed from southern Africa, through the Middle East and India to China. Elsewhere in the Arabian Peninsula found in Saudi Arabia, UAE, Yemen. Also found on Soqotra.

Distribution map & Illustration: 422.

Notes: Cut branches are used as toothbrushes throughout Arabia. The leaves and fruits are edible. Used in traditional medicine to treat parasitic infections and ulcers in camel. The species is in cultivation at the National Botanical Garden, Sultan Qaboos University, Oman.

54. Euphorbiaceae

Bibliography

Govaerts, R., Frodin, D. G., Radcliffe-Smith, A. (2000). *World Checklist and Bibliography of Euphorbiaceae*. Royal Botanic Gardens, Kew.
Radcliffe-Smith, A. (2001). *Genera Euphorbiacearum*. Royal Botanic Gardens, Kew.

Key to the genera of Euphorbiaceae in Oman

1. Male and female flowers very reduced and enclosed within an involucre; latex always present . . . . . 11. **Euphorbia**
1. Male and female flowers not as above; latex present or absent
   2. Inflorescence condensed, subtended by 2 persistent foliaceous bracts 9. **Dalechampia**
   2. Inflorescence not as above
      3. Indumentum stellate
         4. Filaments free, incurved in bud . . . . . 5. **Croton**
         4. Filaments fused into a column, erect in bud . . . . . 6. **Chrozophora**
      3. Indumentum simple, glandular or not
         5. Petals present
            6. Leaves simple or palmately lobed; stamens unbranched . . . . 10. **Jatropha**
            6. Leaves palmately lobed, lobes glandular serrate; stamens branched, filaments variously united . . . . . 8. **Ricinus**
         5. Petals absent, if present then minute and only in females flowers (e.g. *Andrachne*)

7. Pistillode absent in male flowers
   8. Female flower bracts foliaceous, conspicuous, toothed (in Oman) or lobed; stamens 8; filaments free ..... 7. **Acalypha**
   8. Female flower bracts not conspicuous; stamens 3; filaments fused ..... 2. **Phyllanthus**
7. Pistilllode present in male flowers
   9. Filaments adnate to pistillode; stipules narrow ..... 3. **Meineckia**
   9. Filaments not adnate to pistillode
      10. Plant glabrous; pedicels capillary; female flowers with disc flat, annular, or shallowly 5–6-lobate ..... 1. **Flueggea**
      10. Plant pubescent; pedicels not capillary; female flowers with disc glands free ..... 4. **Andrachne**

1. **Flueggea** Willd.

About 13 species, mainly Old World but extending into the temperate regions and the New World tropics.

Flueggea virosa (Roxb. ex Willd.) Voight, Hort. Suburb. Calcut. 152 (1845).
Basionym: *Phyllanthus virosa* Roxb. ex Willd. (1809).
Vernacular names: ʿoṭf (Jibbālī).

Description: Shrub or small tree, up to 5 m, deciduous; stems reddish brown, glabrous. Leaves alternate, 1–8 × 1–6 mm, broadly obovate to suborbicular to elliptic, apex acute to apiculate, base cuneate, margin entire, glabrous, bluish-green above, paler beneath; petiole 3–10 mm. Inflorescence of axillary clusters; flowers dioecious, male flowers 20–40 per cluster, female 3–10 per cluster; pedicels capillary. Sepals ± 1 mm, ovate, glabrous in both male and female flowers. Petals absent. Male flowers: stamens 5, rudimentary ovary (pistillode) present with 3 reflexed styles. Female flowers: disc flat, annular; ovary 3- locular, styles 3, bifid. Capsule 3–5 mm in diameter, subglobose, epicarp fleshy, whitish-green. Seeds ovoid, smooth, glossy.

Flowering and fruiting: May to June.

Distribution and habitat: Southern Oman, Dhofar, in the wet escarpment woodlands, with *Anogeissus*, *Delonix* and other woodland species. *Altitude*: 500–900 m. Distributed throughout the Old World tropics. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen. Also found on Soqotra.

Distribution map: 423.

Notes: The leaves and flowers appear before the monsoons; the flowers are visited by honey bees and yield a much preferred dark honey. The wood has been used traditionally as building material for livestock enclosures.

2. **Phyllanthus** L.

About 600 species distributed mainly in the tropics; a few in temperate regions (absent from Europe and N Asia).

1. Stems of only one type; cataphylls (scale-like leaves) absent ..... 2. **P. maderaspatensis**
1. Stems of two or three types; cataphylls present
   2. Plant completely glabrous; sepals of male and female flowers 5; disc 5-lobed with lobes triangular ..... 2. **P. amarus**

2. Plant subglabrous to scabrid; sepals of male and female flowers 6
   3. Leaves oblong-ovate to obovate; female disc irregularly deeply 6–10-lobed ..... 1. **P. fraternus**
   3. Leaves oblong-ovate to obovate to suborbicular; female disc annular ..... 3. **P. rotundifolius**

1. ***Phyllanthus fraternus*** Webster, Contr. Gray Herb. 176: 53 (1955) & J. Arn. Arb. 38(4): 309 (1957).
Vernacular names: getaytiyah (for *Phyllanthus* spp.)

Description: Annual herb, up to 20 cm; stems differentiated into long, short and intermediate shoots, erect, branched, glabrous to sparsely white-hairy. Leaves of 2 types (scale-like cataphylls on short and long shoots, and foliage-leaves on intermediate shoots). Cataphylls ± 1 mm, linear-lanceolate, subtending the intermediate shoots. Leaves alternate, 3–6 × 2–3 mm (up to 12 × 6 in Saudi Arabian material), oblong-ovate to obovate, apex acute to obtuse, base rounded, margin entire, glabrous to sparsely white-hairy; petiole ± 0.5 mm, capillary; stipules ± 0.5 mm, lanceolate with white margins. Flowers monoecious, axillary, solitary, arranged on the lower part of the stem. Male flowers ± 1 mm across; sepals ovate, ± 0.5 mm, green with white margins, entire, disc glands lobed; stamens 3, filaments fused almost to the anthers. Female flowers ± 1 mm, increasing to ± 2 mm in fruit; sepals obovate, green with a white hyaline margin; disc deeply 6–10-lobed. Capsule 2–3 mm in diameter, depressed globose, yellow-green, glabrous.

Flowering and fruiting: September.

Distribution and habitat: Southern Oman, in disturbed and waste places. *Altitude*: 10–100 m. Distributed from Pakistan to NW India; naturalized in Africa and the Arabian Peninsula. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map: 424.

Notes: The Oman material that I have seen is sparsely hairy, but the other Arabian material is glabrous.

2. ***Phyllanthus amarus*** Schumach. & Thonn. in C.F. Schumacher, Beskr. Guin. Pl. 421 (1827).
Synonyms: *Phyllanthus niruri* L. var. *amarus* (Schumach. & Thonn.) Leandri (1958).
Vernacular names: getaytiyah (generic term for *Phyllanthus* spp.)

Description: Annual herb, up to 20 cm; stems erect to decumbent, mostly branching from the base, glabrous. Cataphylls ± 1 mm, linear-lanceolate. Leaves alternate, 3–6 × 2–3 mm, oblong-ovate to obovate, apex acute to obtuse, base rounded, margin entire, glabrous; petiole ± 0.5 mm, capillary; stipules ± 0.5 mm, lanceolate with white margins. Flowers monoecious, axillary, solitary, arranged on the lower part of the stem. Male flowers ± 1 mm across; sepals ovate, ± 0.5 mm, green with white margins, entire; disc glands rounded; stamens 3, filaments fused almost to the anthers. Female flowers ± 1 mm, increasing to ± 2 mm in fruit; sepals obovate, green with a white hyaline margin. Capsule ± 2 mm in diameter, depressed globose, yellow-green, glabrous.

Flowering and fruiting: September.

Distribution and habitat: Northern and Southern Oman, in irrigated and moist places; weedy in date gardens. *Altitude*: 10–100 m. Distributed in tropical America, Mexico and Florida; introduced elsewhere. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map: 425.

3. ***Phyllanthus rotundifolius*** Klein ex Willd., Sp. Pl. 4: 584 (1805).

Vernacular names: getaytiyah (generic term for *Phyllanthus* spp.)

Description: Small shrub up to 40 cm; stems erect, branched, scabrid. Cataphylls linear-lanceolate. Leaves alternate, 6–16 × 3–10 mm, oblong-ovate to obovate to suborbicular, apex acute to obtuse, base rounded, margin entire, scrabulous to glabrous; petiole 1–2 mm, capillary; stipules ± 1 mm, linear, white. Flowers monoecious, the male and female flowers together, usually with 1–2 male and 1 female arranged on the lower part of the stem. Male flowers ± 2mm across; sepals ovate, ± 1 mm, green, entire; disc glands rounded to crenate; stamens 3, filaments fused almost to the anthers. Female flowers ± 1 mm, increasing to ± 3 mm in fruit; sepals obovate, reddish-green with a clear hyaline margin, arranged in two whorls of 3. Capsule ± 1 mm in diameter, depressed globose, glabrous.
Flowering and fruiting: September.

Distribution and habitat: Southern Oman, in moist thicket in woodland dominated by *Anogeissus dhofarica*, and wadis; also in *Euphorbia balsamifera* zone. *Altitude*: 50–800 m. Distributed in Cape Verde Islands, and from tropical Africa eastwards to India, Sri Lanka. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen. Also found on Soqotra.

Distribution map: 426.

4. ***Phyllanthus maderaspatensis*** L., Sp. Pl.: 982 (1753).
Vernacular names: getaytiyah (generic term for *Phyllanthus* spp.).

Description: Small shrub up to 50 cm; stems sparsely branched, glabrous, glaucous. Cataphylls absent. Leaves alternate, 7–30 × 2–3 mm, oblong to oblanceolate, apex obtuse to rounded, tapering into a short or sessile base, margin entire; stipules ± 2 mm, lanceolate. Flowers monoecious, male and female flowers together, axillary, in clusters usually with 2–4 male and 1 female arranged on the lower part of the stem; fruiting pedicels ± 2 mm. Male flowers ± 2mm across; sepals ovate, ± 1 mm, green or pinkish, entire; disc glands rounded; stamens 3, filaments fused almost to the anthers. Female flowers ± 2 mm, increasing to ± 4 mm in fruit; sepals obovate, reddish-green with a clear hyaline margin, arranged in two whorls of 3. Capsule 3–4 mm in diameter, depressed globose, glabrous. Seeds smooth.

Flowering and fruiting: April; September.

Distribution and habitat: Northern and southern Oman, in cultivated and irrigated locations, date gardens; weedy. *Altitude*: 100–250 m. Distributed from tropical Africa eastwards to India, Sri Lanka, China and N Australia. Elsewhere in the Arabian Peninsula found in Bahrain, Kuwait, Qatar, Saudi Arabia, UAE, Yemen. Also found on Soqotra.

Distribution map: 427.

3. **Meineckia** Baill.
19 species distributed in America, SW and NE tropical Africa, S Arabia, Madagascar, S India.

Meineckia phyllanthoides Baill., Etud. Gen. Euph.: 587 (1858).
subsp. ***phyllanthoides***
Synonyms: *Securinega phyllanthoides* (Baill.) Muell. Arg. in DC. (1866).

Description: shrub, up to 50 cm; younger branches angular. Leaves alternate, 14–57 × 7–35 mm, ovate to elliptic, thin and somewhat papery, base rounded, apex rounded to slightly apiculate, margin entire, pale green above, grey-green below; petiole 5–12 mm, thin; stipules lanceolate, denticulate with a few hairs on the margins. Flowers monoecious; female flowers solitary with several male flowers, all axillary; pedicel ± 10 mm, filiform, elongating to 14(–16) in fruit. Calyx lobes 1–1.5 mm, subrotund to obovate, green with pale margins. Disk with an erose margin. Capsule ± 3 mm in diameter, pale yellow-green, glabrous, nodding.

Flowering and fruiting: September, October.

Distribution and habitat: Southern Oman, in wadis in the escarpment mountains, with *Anogeissus*, *Croton* and *Acacia hamulosa*. *Altitude*: 40–150 m. Distributed in NE Africa to SW Arabia. Elsewhere in the Arabian Peninsula found in Yemen.

Distribution map: 428.

Notes: Some of the Oman material keys out to *M. cappillariformis* Webster (distributed in tropical east Africa) separated on its longer fruiting pedicels (19–25 mm).

4. **Andrachne** L.

About 25 species distributed in the tropics and subtropics of the world.

Leaves orbicular or ovate, glabrous, with short petioles; stipules papery ..... 1. **A. telephioides**

Leaves reniform-orbicular, glandular scabrous, with long petioles; stipules green with a hyaline margin ..... 2. **A. aspera**

1. ***Andrachne telephioides*** L., Sp. Pl.: 1014 (1753).

Synonyms: *Andrachne rotundifolia* (1831); *A. telephioides* var. *rotundifolia* (C.A.Mey.) Muell. Arg. in DC. (1866); *A. virescens* Stapf (1886).

Description: Perennial low shrub, with a woody rootstock; stems up to 25 cm, arising from the top of the stock, ± prostrate to ascending, spreading, reddish. Leaves alternate, dark glaucous-green, (0.5–)4–7(–11) × (1–)3–5(–9) mm, ovate to broadly ovate to rotund, apex rounded with a small mucro, base rounded, margin entire or obscurely serrulate; petiole 1–2 mm; stipules papery, reddish in fresh material. Flowers axillary, solitary or fascicled, usually with 2 male flowers and one female per fascicle. Pedicels 1 mm. Male flowers ± 2 mm across; sepals ± 1 mm; petals shorter than the sepals. Female flowers ± 3 mm across. Capsule 2–2.5 mm in diameter, depressed-globose, green to yellow-green, somewhat 3-lobed.

Flowering and fruiting: May; September to October.

Distribution and habitat: Throughout Oman, and on the offshore islands Masirah and Al Halaniyah, in sand and gravel wadis, rock crevices, in open scrub, wadi beds and sandy depressions. *Altitude*: 30–1900 m. Distributed in Cape Verde Islands, Mediterranean Europe, and from N Africa to C Asia. Elsewhere in the Arabian Peninsula found in Bahrain, Qatar, Saudi Arabia, UAE, Yemen. Also found on Soqotra.

Distribution map: 429.

Notes: Size and shape of leaves is extremely variable.

2. ***Andrachne aspera*** Spreng., Syst. Veg. 3: 884 (1826).

Synonyms: *Andrachne aspera* var. *glandulosa* Hochst. ex A. Rich. (1850).

Vernacular names: shajarat al ʿaqrab.

Description: Perennial low shrub, with a woody rootstock; stems up to 40 cm, ± prostrate to ascending, spreading. Leaves alternate, dark glaucous green, 7–11 × 10(–16)–15(–25) mm, reniform-orbicular, apex rounded with a small mucro, base rounded to slightly cordate, margin entire; petiole (3–)5–8 mm; stipules ovate, green with a hyaline margin. Flowers solitary, axillary. Pedicels 3–5 mm. Male flowers ± 2 mm across; sepals ± 1 mm, denticulate; petals shorter than the sepals. Female flowers ± 4 mm across. Capsule 2.5–3 mm in diameter, depressed-globose, glandular-pubescent.

Flowering and fruiting: April; August to September.

Distribution and habitat: Southern and northern Oman, in gravel wadis, amongst rocks and boulders, and rocky slopes; in Dhofar on the foothills of the escarpment mountains. *Altitude*: 10–800 m. Cape Verde Islands, W Africa and N Africa to Pakistan. Elsewhere in the Arabian Peninsula found in Bahrain, Saudi Arabia, Yemen. Expected to be found in UAE. Also found on Soqotra.

Distribution map: 430.

Notes: The species is variable in its pubescence; densely glandular forms are recorded from Jebel Qara and completely glabrous forms are recorded from Yemen.

5. **Croton** L.

About 800 species distributed from tropical Africa to South Africa and Madagascar, Arabia, China and Eastern Asia to India and Australia, the Pacific, W Canada to Argentina.

Croton confertus Baker, Kew Bull. 1895: 186 (1895).
Type: Oman: Dhofar Mts, Bent 5/95 (holotype K).
Vernacular names: ḥor (Jibbālī).

Description: Shrub or small tree, deciduous, up to 5 m; bark smooth, grey; young branches white stellate-pubescent. Leaves alternate, yellow-green, 5–12 × 3–9.5 cm, ovate to broadly-ovate, apex rounded to acute, base cordate, margin entire or sometimes sinuate, veins prominent on the undersurface; petiole 5–13 cm. Inflorescence racemose, terminal; Flowers monoecious with female flowers below and male flowers above, female flowers opening first. Male flowers: sepals 5–8, ± 4.5 mm, broadly ovate, fused at base, stellate-pubescent; petals 3–5, ± 4 mm, oblong; stamens exserted. Female flowers: sepals 5; petals absent; ovary 3–4 locular, densely stellate-pubescent; style arms 3–4, each dichotomously branched again. Capsule 10–15 mm in diameter, densely stellate-tomentose, pale brown; seed oblong-ovoid, ± 8 mm, pale brown.

Flowering and fruiting: March; August to October.

Distribution and habitat: Southern Oman, Dhofar, common on the lower altitudes of the wet escarpment mountains, in woodland with *Acacia senegal*, *Delonix elata*, *Euphorbia smithii* and *Commiphora* spp. *Altitude*: 350–800 m. Distributed in Ethiopia. Elsewhere in the Arabian Peninsula found in E Yemen.

Distribution map & Illustration: 431.

Notes: Leaves and new shoots have been used in traditional medicine for coughs, to relieve pain and inflammation, purify blood and as a general tonic; an infusion of fruits have been taken to relieve constipation and stomachache. The flowers are visited by bees and butterflies.

6. **Chrozophora** Neck ex A. Juss. ("Crozophora") (nomen conserv.)
12 species distributed from the Mediterranean region to India, Arabia and Africa.

Chrozophora oblongifolia (Del.) A.Juss. ex Spreng., Syst. Veg. 3: 850 (1826).
Basionym: Croton oblongifolius Del. (1812).
Vernacular names: mashariya, tannūm, tinīb.

Description: Shrub to 50 cm; stems ± glabrous in the lower part, densely stellate-pubescent above. Leaves alternate, grey-green, 25–90 × 8–55 mm, ovate to ovate-oblong, apex acute or obtuse, base truncate, margin coarsely dentate; petiole 5–30 mm, densely stellate-pubescent, veins prominent on the under-surface; stipules filiform. Inflorescence of male and female flowers in panicles, female flowers at the base, male flowers above in a short spike. Disk 5-lobed. Sepals ± 2 mm. Petals present. Capsule 3-lobed, 5–7 mm in diameter, covered with peltate scales, stellate hairs and tubercles, 3-seeded.

Flowering and fruiting: September to February.

Distribution and habitat: Northern and Southern Oman, in the foothills, gravel and rocky hillsides, waste and disturbed places. Common. *Altitude*: 20–350 m. Distributed in NE Africa, Sinai, Pakistan. Elsewhere in the Arabian Peninsula found in Saudi Arabia, UAE, Yemen. Also found on Soqotra.

Distribution map & Illustration: 432.

Notes: The juice from the plant stains blue-black, which has been used in the preparation of ink.

7. **Acalypha** L.
About 450 species distributed in the warmer regions of the world.

Acalypha indica L., Sp. Pl. 1003 (1753).
Vernacular names: ma'telig, reweteḥ (Jibbālī).

Description: Monoecious annual herb; stems erect up to 70 cm. Leaves alternate, 2–9 × 1–5 cm, ovate, apex acute, base rounded, margin serrate, glabrescent or sparsely pubescent; stipules setaceous; petiole up to 10 cm. Inflorescences terminal or axillary; flowers monoecious with the upper flowers male, arranged in a slender spike, and lower flowers female in groups of 3–5 subtended and surrounded by a bract with toothed margins, 5–10 mm long. Male flowers minute, ± 1 mm; sepals 4; petals absent; stamens 8. Female flowers: sepals 3; petals absent; ovary 3-locular; styles 3. Fruit 3-lobed, 2–3 mm in diameter, hispid. Seed brown with a white linear appendage near the top.

Flowering and fruiting: September.

Distribution and habitat: Southern Oman, Dhofar, on the escarpment mountains, by waterholes, and beside tract roads, in shade and often moist locations; common and weedy. *Altitude*: 50–800 m. Distributed throughout the Old World tropics. Elsewhere in the Arabian Peninsula found in Saudi Arabia, UAE, Yemen. Also found on Soqotra.

Distribution map & Illustration: 433.

Notes: The whole plant is edible, but is sour to taste.

8. **Ricinus** L.

Monotypic; originally (probably) from NE Africa, now naturalized throughout the warmer parts of the world.

Ricinus communis L., Sp. Pl.: 1007 (1753).

Vernacular names: 'arash (also Ẓufari Arabic), kharwah, khirwah; 'ash'asheh, tifsheh, gunigunt (Ẓufari Arabic,), junijund, tifseh (Jibbālī).

Description: Monoecious; perennial herb or shrub with herbaceous stems, up to 2 m; stems erect, branched, glabrous, older stems hollow. Leaves alternate, palmately 5–11-lobed, up to 20(–70) cm long and wide, peltate, lobes acute, margin serrate, glabrous; stipules soon deciduous; petiole 20–30 cm, stout with conspicuous oil gland near the base. Inflorescence terminal, paniculate; flowers monoecious with female flowers above the male flowers. Male flowers: sepals 2–5, ± 4 × 5 mm, connate at base; petals absent; stamens numerous with branched filaments. Female flowers: sepals 2–5, connate at base; petals absent; ovary 3-locular, covered in green soft spines. Capsule ± 12 × 12 mm, with soft spines, dehiscing explosively. Seeds oblong-ellipsoid, pale brown with dark brown blotches, with a white appendage at the apex.

Flowering and fruiting: August to October.

Distribution and habitat: Northern and southern Oman, on hills and coastal areas, on waste and disturbed ground, beside roads and on wadi banks; somewhat weedy. *Altitude*: 20–800 m. Distributed naturally in NE tropical Africa, elsewhere naturalized and cultivated. Elsewhere in the Arabian Peninsula found in Kuwait, Qatar, Saudi Arabia, UAE, Yemen. Also found on Soqotra.

Distribution map & Illustration: 434.

Notes: Cultivated for the production of castor oil, which is extracted from the seeds. The plant is not commonly used in Dhofar, except for the oil (which is also imported), but in northern Oman the leaves and roots are used for treating bad breath, blisters and ulcers, toothache and inflamed eyes; oil is used as a purgative and for massage to relieve rheumatic pain.

9. **Dalechampia** L.

About 110 species distributed from tropical Africa to South Africa and Madagascar, Arabia, S China to W Malesia and from Mexico to Argentina.

Dalechampia scandens L., Sp. Pl.: 1054 (1753)

var. ***cordofana*** (Hochst. ex Rich.) Müll.Arg., Prodr. 15, 2: 1245 (1866).

Synonyms: *Dalechampia parviflora* Lam. (1786); *D. cordofana* Hochst. ex. Webb (1849); *D. scandens* var. *parviflora* (Lam.) Müll.Arg. in DC. (1866).

Description: Woody-based climber, up to 3 m; stems pubescent. Leaves alternate, yellow-green, palmately deeply lobed, each lobe 3–65 × 11–25 mm, oblong-lanceolate, apex acute, margin serrate, pubescent; petiole 30–50 mm, pubescent. Inflorescence pedunculate, peduncle up to 15 cm; flowers monoecious, subtended by 2 bracts; bracts pale green or yellow-green, 12–15 × 18–23 mm, ovate, 3-lobed at the apex, green veined. Male flowers in a cluster of 5 cymes, surrounded by an involucre of 4 fused (or free) bracts and 1–5 female flowers surrounded by fused bracts or sterile flowers. Male flowers: calyx 4–6-lobed, involucre 5–8 mm across. Female flowers 3, bracts ± 3 mm, ciliate, margins glandular; sepals 6, ± 8 mm, margins with fine gland-tipped lobes, stinging hairs on the margins. Capsule 3-lobed, ± 5 mm in diameter, yellow-green, pubescent.

Flowering and fruiting: April in northern Oman; September to October in Dhofar.

Distribution and habitat: Northern and southern Oman, in the foothills of the Eastern Hajar and in Dhofar, in gravelly wadis, with *Ficus*, *Acridocarpus*. *Altitude*: 50–850 m. Distributed in Cape Verde Islands, tropical Africa, S Pakistan, India. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map & Illustration: 435.

Notes: The leaves are quite variable in the size and shape of the lobes. Not common in northern Oman, and I have collected it only once, from a wadi near Bimah in the Eastern Hajar. Care should be taken when handling this plant as the hairs on the bracts are stinging.

10. **Jatropha** L.
About 175 species distributed throughout the tropics and subtropics of the world.

Leaves densely hairy; lobes of leaves rounded .....1. **J. glandulosa**
Leaves glabrous; lobes of leaves acute .....2. **J. dhofarica**

1. ***Jatropha glandulosa*** Vahl, Symb. Bot. i: 80 (1790).
Vernacular names: zebrot, zīrot (Jibbālī); zeberwot, zebrot (Ẓufari Arabic).

Description: Shrub up to 1 m; stems reddish brown, exuding a clear latex, densely white hairy. Stipules ± 1 mm, dark brown; leaves alternate, palmately 5-lobed, 2–3 × 4–6 cm, lobes rounded, margin serrate to dentate, dull green, densely white-hairy; petiole 2–4 cm. Inflorescence of many-flowered terminal panicles; flowers monoecious with more male flowers than female; bracts ± 3 mm, ovate; a disc with 5 subglobose glands present at the base of filaments and ovary; male flowers: sepals 5, ± 1 mm, ovate, white-hairy; petals 5, 3–4 mm, greenish-yellow; stamens 8, filaments united to 3/4 the length; female flowers: sepals and petals ± same as in the male flowers, ovary 3-locular, glabrous. Capsule subglobose, 10–11 mm in diameter, green. Seed oblong-ellipsoid, brown, smooth, apex with a rounded tip.

Flowering and fruiting: August to October.

Distribution and habitat: Southern Oman, Dhofar, on the drier lower hills of the escarpment mountains, and coastal hills. *Altitude*: 50–200 m. Distributed throughout the tropics. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map: 436.

2. ***Jatropha dhofarica*** Radcliffe-Smith, Kew Bull. 35: 253 (1980).
Vernacular names: zebrot, zīrot (Jibbālī); zeberwot, zebrot (Ẓufari Arabic).

Description: Shrub up to 3 m; stems somewhat herbaceous, greyish brown, exuding a clear or red latex, older stems covered with leaf scars. Stipules ± 1 cm, divided into segments, dark brown. Leaves alternate, somewhat crowded at the end of branches, palmately 7-lobed, 2–15 × 6–8 cm, lobes acute, margin dentate to aristate, bright green, glossy; petiole 10–12 cm. Inflorescence of many-flowered terminal panicles, with more male flowers than female. Bracts up to 3 cm, oblong-ovate, serrate towards the apex. A disc with 5 subglobose glands present at the base of filaments and ovary. Male flowers: sepals 5, ± 1 mm, ovate, glabrous; petals 5, 4–5 mm, yellow or greenish-yellow; stamens 8, filaments united to 3/4 the length. Female flowers: sepals and petals ± same as in the male flowers, ovary 3-locular, glabrous. Capsule subglobose, 9–10 mm in diameter, pale green. Seed oblong-ellipsoid, brown, smooth, apex with a fimbriate tip.

Flowering and fruiting: September to early November.

Distribution and habitat: Southern Oman, Dhofar, on the escarpment mountains, in woodland with *Anogeissus*, *Blepharispermum*, *Croton* and other woodland species; common. *Altitude*: 350–800 m. Endemic to the Dhofar mountains.

Distribution map & Illustration: 437.

Notes: The plant has been used in traditional medicine for its sap, which is applied over wounds and skin sores as an antiseptic and to stop bleeding, the sap drying over the wound forming a sort of scab. It is also dripped into sore eyes and ears to reduce swelling and infection. Crushed flowering tips and buds have been put in wounds to stop bleeding, and new shoots rubbed on hands and body as a deodorant, and the leaves used as a cleansing and washing agent.

11. **Euphorbia** L.

About 1600 species, cosmopolitan in distribution.

Species of *Euphorbia* in Oman contain a white latex; the flowers are monoecious; the inflorescence, a cyathium, contains a single pistillate flower, represented by a pedicellate tri-locular ovary, surrounded by 4(–5) staminate cymes, with each male flower represented by a single pedicellate stamen. The bracts are modified to form an involucre with nectaries at the tips.

1. Trees, shrubs and herbs; leafy
   2. Trees, shrubs or perennial herbs
      3. Deciduous tree (± 5 m tall). [Leaves alternate, obovate; cyathia terminal, in groups of 3] . . . . . .14. **E. smithii**
      3. Shrubs or perennial herbs
         4. Tall shrub (± 2 m); leaves crowded, appearing whorled . . . .15. **E. cuneata**
         4. Small shrubs or subshrubs, less than 2 m tall
            5. Stems thick and fleshy, often covered with leaf scars; roots tuberous; woodland and shrubland species
               6. Leaves in terminal rosettes
                  7. Small plant, up to 6 cm; stems unbranched; leaves 3–4, green . . . . . .18. **E. hadramautica**
                  7. Shrub to 50 cm; stems branched; leaves many, blue-green . . . . . .16. **E. balsamifera**
               6. Leaves not in terminal rosettes
                  8. Cyathia solitary
                     9. Leaves lanceolate to linear-lanceolate; involucre glands . . . . . .20. **E. longituberculosa**
                     9. Leaves broadly ovate to orbicular; involucre glands 3 or 4 . . . . . .21. **E. orbiculifolia**
                  8. Cyathia in groups. [Plant up to 30 cm; leaves obovate to suborbicular] . . . . . .19. **E. pirottae**
            5. Stems not thick or fleshy, distinctly zigzag, tinged red, leafy; roots not tuberous; on stabilized coastal dunes . . . . . .6. **E. riebeckii**
   2. Annual herbs
      10. Apical branches forming pseudo-umbels
         11. Pseudo-umbel 3-rayed with 3 leaves subtending the pseudo-umbel rays. [Stem leaves elliptic-obovate to orbicular; cyathia pedunculate] . . . . . .9. **E. peplus**
         11. Pseudo-umbel 3–5-rayed with 3–5 leaves subtending the pseudo-umbel rays

12. Stem leaves obovate-spatulate, obtuse at apex; pseudo-umbel leaves 5; cyathia sessile, green .....8. **E. helioscopia**
12. Stem leaves oblanceolate to linear oblanceolate, acute at apex; pseudo-umbel leaves 3–5; cyathia subsessile, yellow .....8. **E. falcata**

10. Apical branches not forming pseudo-umbels
13. Cyathia in terminal clusters. Tall herb, leaves with dentate or serrate margins; upper leaves red or purple at base .....7. **E. heterophylla**
13. Cyathia axillary
14. Cyathium solitary
15. Small prostrate plant; leaves very small, to 8 mm; capsule pubescent .....5. **E. granulata**
15. Plant ± erect; leaves larger than above; capsule glabrous 3. **E. serpens**
14. Cyathia in clusters
16. Cyathia in sessile, axillary clusters, glands white .....4. **E. arabica**
16. Cyathia on short axillary shoots
17. Leaves with serrate margins; cyathial clusters sessile ...2. **E. indica**
17. Leaves with entire margins; cyathial clusters pedunculate 1. **E. hirta**

1. Aphyllous shrubs (with leaves caducous); stems green, thick or succulent
18. Stems 3(–5)-angled with paired spines on the angles .....17. **E. cactus**
18. Stems not angled or spiny
19. Branches more or less at right angles to the main stem; cyathia terminal, the central sessile, surrounded by 3–5 pedunculate ones .....11. **E. schimperi**
19. Branches not at right angles to the main stem; cyathia 3, the central sessile, the lateral 2 pedunculate .....12. **E. larica**
20. Apical branches spreading; cyathia not solitary, peduncle 1 mm; capsule ± 7 mm across, red when mature .....10. **E. dhofarensis**
20. Apical branches erect, not spreading; cyathia solitary, sessile; capsule ± 5 mm across, brownish when mature .....13. **E. masirahensis**

1. ***Euphorbia hirta*** L., Sp. Pl.: 454 (1753).
Synonyms: *Euphorbia pilulifera* L. (1753); *Chamaesyce hirta* (L.) Millsp. (1909).

Description: Annual herb, up to 15 cm; stems simple or sparsely branched, pubescent with longer, pale yellow multicellular hairs, stems reddish green above. Leaves opposite, 10–40 × 5–15 mm, ovate to ovate-oblong, apex acute, base tapering, margin serrate, sparsely pubescent on both surfaces, reddish-green, 3-nerved from the base; stipules subulate. Cyathia axillary, peduncle ± 8 mm reaching up to 20 mm; glands with small appendages. Capsule 1–1.5 mm, appressed-pubescent.

Flowering and fruiting: February to April.

Distribution and habitat: Northern Oman, a weed of cultivated and irrigated places; not common. *Altitude*: 0–100 m. Distributed in Syria through to Iraq and eastwards to India, China, Malaysia, Japan. Elsewhere in the Arabian Peninsula found in Bahrain, Kuwait, Qatar, Saudi Arabia, UAE, Yemen.

Distribution map: 438.

Notes: A native of Mexico, now found throughout most of the tropics and subtropics of the world.

2. ***Euphorbia indica*** Lam., Encycl., 2: 423 (1788).
Synonyms: *Chamaesyce indica* (Lam.) Croizat (1942); *Euphorbia granulata* Forssk. var. *decumbens* Forssk. (1775).

Description: Annual herb, up to 30 cm; stems simple to branched, ascending to ± erect, pubescent but multicellular hairs lacking, stems reddish green. Leaves opposite, ± sessile, 10–25× 8–11 mm, oblong, apex obtuse, base ± truncate, margin minutely serrate, glabrous to sparsely pubescent, 3-nerved from the base; stipules filiform. Cyathia axillary in dense clusters, deep reddish purple, peduncle short; glands with white or pink appendages. Capsule 1–1.5 mm, sparsely pubescent.

Flowering and fruiting: February to April.

Distribution and habitat: Northern and southern Oman, as a weed of cultivated and irrigated places, irrigation ditches, tree pits; not common. *Altitude*: 5–50 m. Distributed in tropical Africa, Iraq and eastwards to India, China. Elsewhere in the Arabian Peninsula found in Kuwait, Saudi Arabia, UAE, Yemen. Also found on Soqotra.

Distribution map: 439.

3. ***Euphorbia serpens*** Kunth, Humb. Bonpl. & Kunth, Nov. Gen. Sp. 2: 52 (1817).
Synonyms: *Chamaesyce serpens* (Kunth) Small (1903).

Description: Annual herb; stems prostrate, much branched, glabrous, reddish green. Leaves opposite, often purple to reddish green, ± sessile, 2–5× 1–2 mm, broadly ovate, apex obtuse, base truncate, margin entire, glabrous; stipules ovate, fringed at the apex. Cyathia axillary; peduncle ± 2 mm; glands with white appendages. Capsule 2–3 mm, glabrous, yellow-green.

Flowering and fruiting: February to April.

Distribution and habitat: Northern Oman, Musandam; not common. *Altitude*: ± 150 m. Distributed from America to Argentina and Macaronesia. Elsewhere in the Arabian Peninsula found in Kuwait, Qatar, Saudi Arabia, UAE, Yemen.

Distribution map: 440.

Notes: This species has been collected only from Musandam, but is expected to occur elsewhere in northern Oman and is perhaps overlooked.

4. ***Euphorbia arabica*** Hochst. & Steud. ex Anderson, Fl. Aden. 34 (1860).
Synonyms: *Anisophyllum arabicum* (Hochst. & Steud. ex Anderson) Schweinf. (1867); *Chamaesyce arabica* (Hochst. & Steud. ex Anderson) Soják (1972).

Description: Annual herb, up to 20 cm; stems delicate, branched, ascending to ± erect, glabrous to very sparsely pubescent, reddish brown. Leaves opposite, ± sessile, 10–20 × ±1 mm, linear to linear-oblong, apex acute, base rounded, margin entire, glabrous, greenish-purple; stipules narrow triangular. Cyathia axillary, peduncle ± 1 mm, glabrous; glands with white or pink appendages. Capsule 1–1.5 mm, glabrous.

Flowering and fruiting: February to April; September.

Distribution and habitat: Northern and southern Oman, in wadis, amongst stones, in shaded and moist places. *Altitude*: 60–100 m. Distributed in Kenya, NE Africa, Egypt, Iraq, Iran. Elsewhere in the Arabian Peninsula found in Kuwait, Saudi Arabia, Yemen.

Distribution map: 441.

Notes: The name of this species is based on a specimen collected from Yemen (Aden) by G. Schweinfurth (syntypes K).

5. ***Euphorbia granulata*** Forssk., Fl. Aegypt.-Arab. 94 (1775)
var. ***glabrata*** (Gay.) Boiss. in DC., Prodr. 15(12): 34 (1862).
Synonyms: *Chamaesyce granulata* (Forssk.) Soják var. *glabrata* (Boiss.) V.S.Raju & P.N.Rao (1978).
Vernacular names: ḥerum dhezēn, tur ēūrn (Jibbālī), kibdenīt (Harsūsī).

Description: Annual herb, up to 10 cm, with a woody base, the annual stems dying completely after the summer months; stems prostrate, branched, reddish green to purple-green. Leaves opposite, ± sessile, 1.5–5(–8) × 1–4 mm, oblong, apex obtuse, sometimes with a small mucro at the apex, base rounded, unequal, margin entire, glabrous, sparsely pubescent, greenish-purple; stipules narrow triangular. Cyathia solitary, axillary, peduncle reflexed at maturity, pubescent; glands reddish-purple with white appendages. Capsule ± 1 mm, glabrous.

Flowering and fruiting: February to April; September.

Distribution and habitat: Northern and southern Oman, in wadis amongst stones, and in sandy depressions. *Altitude*: 50–700 m. Distributed in NW Kenya, NE Africa, Egypt (Sudan, Ethiopia, Somalia). Elsewhere in the Arabian Peninsula found in Bahrain, Kuwait, Saudi Arabia, Yemen. Also found on Soqotra on Samha and Abd al Kuri.

Distribution map: 442.

Notes: All our material is referable to var. *glabrata*.

6. ***Euphorbia riebeckii*** Pax, Bot. Jahrb. 28: 26 (1899).
Synonyms: Chamaesyce riebeckii (Pax) Soják (1972).
Vernacular names: gisherīb (Harsūsī).

Description: Woody low shrub, up to 80 cm, stems intricate and appearing zigzag, lateral stems ending in spines, grey-brown. Leaves opposite, ± sessile, 3–6 × 1.5–3 mm, oblong to obovate, apex obtuse, base rounded, unequal, margin entire, glabrous, grey-green; stipules subulate, entire. Cyathia solitary, cupular, lobes ciliate; glands red with small hairy appendages. Capsule ± 1 mm, glabrous.

Flowering and fruiting: February to March.

Distribution and habitat: Northern Oman, on low sand dunes and sandy wadis. *Altitude*: 20–100 m. Endemic to the Arabian Peninsula, also found in SE Yemen and the UAE.

Distribution map & Illustration: 443.

Notes: In Oman, the species is restricted in its distribution to the Jiddat al Harasīs, the eastern coast and inland on the sandy areas on the outskirts of Ramlat Wahibah. Heavily browsed by goats and camels; locally common in the eastern part of the Jiddat al Harasīs where it is considered to be good for camels and goats.

7. ***Euphorbia heterophylla*** L., Sp. Pl.: 453 (1753).

Description: Annual herb, up to 0.5 m; stems simple or sparsely branched, pubescent, purple-green. Leaves opposite, dull green, 4–8 × 2–5 cm, ovate-lanceolate, apex acute, base tapering,

margin irregularly serrate, pubescent on the undersurface with multicellular hairs. Cyathia terminal in pedunculate cymes; peduncle 6–11 mm; glands yellow. Capsule 4–5 mm, yellow-green, glabrous.

Flowering and fruiting: February to April.

Distribution and habitat: Northern and southern Oman, a weed of cultivated and waste places; not very common. *Altitude*: 20–600 m. Distributed throughout the tropical and subtropical regions. Elsewhere in the Arabian Peninsula found in Saudi Arabia.

Distribution map: 444.

8. ***Euphorbia helioscopia*** L., Sp. Pl.: 459 (1753)
subsp. ***helioscopia***

Description: Annual herb, up to 25 cm; stems erect, simple or 2–3-branched from the base, sparsely pubescent with fine hairs. Leaves alternate, sessile, 10–30 × 8–11 mm, obovate-spatulate, apex obtuse to retuse, base tapering, margin minutely crenate; leaves of the pseudumbel ovate, rounded at base. Pseudumbel 5-rayed; peduncle up to 30 mm; secondary peduncles up to 12 mm. Cyathial glands green. Capsule 4–5 mm, pale green, glabrous.

Flowering and fruiting: February to April.

Distribution and habitat: Northern Oman, a weed of cultivated and irrigated places; not common. *Altitude*: ± 500 m. Distributed in N Africa, Europe, temperate Asia and Macaronesia; introduced into N America and other parts of the world. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map: 445.

9. ***Euphorbia peplus*** L., Sp. Pl.: 456 (1753).

Description: Annual herb, up to 30 cm; stems erect, simple or 2–branched from the base, glabrous. Leaves alternate, up to 2.5 cm, ovate, suborbicular or obovate, apex obtuse to retuse, base rounded to cuneate, margin entire; petiole up to 1 cm; leaves of the pseudumbel ovate, ovate-deltoid, sessile. Pseudumbel 3-rayed. Cyathial glands green, with 2 appendages on each side. Capsule ± 2 mm, with 2 ridges or wings on each keel.

Flowering and fruiting: February to March/April.

Distribution and habitat: Northern Oman, as a weed in cultivated date groves and irrigated farms, in the foothills of the Hajar mountains. *Altitude*: 100–350 m. Distributed in Europe, SW Asia, C Asia, Maderia, Canary, Teneriffe, Azores, N Africa; introduced into China and Japan. Elsewhere in the Arabian Peninsula found in Kuwait, Saudi Arabia, Yemen.

Distribution map & Illustration: 446.

Notes: The species has been recorded only once and is apparently not common.

10. ***Euphorbia dhofarensis*** S.Carter, Nord. J. Bot. 12(6): 679 (1992).
Type: Oman, Dhofar, E of Mirbat, Wadi NE of Jaffa, 4 Aug. 1985, Miller 7245 (holotype K; isotype E).

Description: Glabrous much branched succulent shrub, to 50 cm, with spreading cylindrical branches 5–10 mm across. Leaves lanceolate, ± 5 × 2 mm. Cyathia terminal axillary, ± 2.5 ×

4 mm, with funnel-shaped involucre; glands transversely elliptic, green becoming red. Capsule subglobose, ± 7 mm broad, green becoming red at maturity.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, on rocky hill slopes. *Altitude*: ± 250 m. A regional endemic, also found in SE Yemen.

Distribution map: 447.

Notes: This species belongs to a group of closely related species that are difficult to distinguish. It is similar to *Euphorbia larica*, which is common throughout the foothills in Oman (especially N Oman), but distinguished by its capsules, which are red at maturity rather than green with red sutures as in *E. larica*.

11. ***Euphorbia schimperi*** C.Presl, Bot. Bemerk. 109 (1846).
Vernacular names: embeţot (Jibbālī), mebţot (Ẓufari Arabic).

Description: Succulent shrub, up to 1 m and up to 1.5 m across, leafless for most of the year; stems branched with many short branches, ascending, held at about right angles to the main branch, glabrous, bluish-green sometimes reddish. Leaves alternate, deciduous, 5–6 × 3–4 mm, ovate, apex acute, base sessile, margin entire, often reddish at the margins, glabrous. Cyathia in groups, the central sessile surrounded by 3–5 pedunculate cyathia. Bracts subtending the cyathia similar to leaves. Involucre cup-shaped, 4–5 mm long, ± 4 mm across. Cyathial glands 5, yellow-green; marginal lobes fimbriate. Bracts of male flowers fimbriate at tip. Female flowers with glabrous ovary. Capsule 6–7 mm in diameter, subglobose (triangular in cross section), reflexed at maturity, green maturing brown. Seeds oblong-ovoid, angular, smooth.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, in the drier regions, and in the southern foothills of Jebel Semhan; common. *Altitude*: 50–250 m. Distributed in SW Arabia, found in Saudi Arabia and Yemen. Also found on Soqotra.

Distribution map & Illustration: 448.

12. ***Euphorbia larica*** Boiss., Cent. Euphorb. 24 (1860).
Vernacular names: ʿisbaq, esbek, esbakh, mot (also in Jibbālī); osbuq (eastern Hajar, Jebel Aswad area); baʿal ejosot, hebshinut (Jibbālī).

Description: Succulent shrub, up to 1 m and up to 1.5 m across, leafless for most of the year; stems branched, ascending, succulent, glabrous, green or yellowish to bluish-green. Leaves alternate, deciduous, 4–5 × 1–1.5 mm, obovate, apex acute, base attenuate, margin entire, often reddish, glabrous but with a few hairs. Cyathia usually in groups of three, the central sessile and the two lateral shortly pedunculate. Bracts subtending the cyathia 3–4 mm. Involucre cup-shaped, 1–2 long, 4–6 mm across; cyathial glands yellow-green; marginal lobes deeply dentate. Bracts of male flowers fimbriate at tip. Female flowers with glabrous ovary. Capsule 6–8 mm in diameter, subglobose, erect, ± sessile when mature; green suffused with red with 6 red longitudinal stripes, splitting into 6 valves when mature. Seeds oblong-ovoid, slightly rugose.

Flowering and fruiting: February to March; September.

Distribution and habitat: Northern and southern Oman, in the foothills and immediate plains of the mountains, in dry gravel wadis, and on rocky and gravelly slopes; in Dhofar restricted to the dry areas of eastern Dhofar and Mirbat plains. In northern Oman, it is one of the characteristic species of the *Acacia tortilis–Euphorbia larica* vegetation zone (foothill vegetation zone). *Altitude*: 50–800 m. Distributed from southern Iran through Oman to the Hadramaut in Yemen. Elsewhere in the Arabian Peninsula found in UAE, Yemen.

Distribution map & Illustration: 449.

Notes: The plant has been used in traditional medicine for its latex which is collected and applied around a boil to draw out the pus; mixed with fine clay it is used as a depilatory. It is also used for treating boils and wounds in camels and goats.

13. ***Euphorbia masirahensis*** Ghaz., Novon 3: 258–260 (1993).
Type: Oman, NE Masirah Island, Wadi Zamji, *S.A. Ghazanfar* 1515 (holotype BSB, isotypes E, K, ON, SQU-H (Sultan Qaboos University)).

Description: Succulent shrub, up to 70 cm and up to 1.5 m across, leafless for most of the year; stems branched, ascending, succulent, glabrous, bluish-green, new shoots reddish. Leaves alternate, deciduous, 1–1.5 × 1 mm, ovate, reddish-green, glabrous. Cyathia solitary terminal on the main and lateral branches. Bracts subtending the cyathia 2 mm, glabrous. Involucre cup-shaped, 4.5–5 mm long, 6–6.5 mm across. Cyathial glands yellow-green; marginal lobes dentate at apex. Male flowers numerous, bracts dentate at apex. Female flowers with glabrous ovary. Capsule 5–5.5 mm in diameter, subglobose, erect, ± sessile, geen suffused with red when young, dark brown when mature, splitting into 3 bi-valved cocci. Seeds oblong, smooth.

Flowering and fruiting: November to early January, but also more or less throughout the year.

Distribution and habitat: Northern Oman, Masirah Island, on stony and gravelly slopes and wadi banks of Jabal Dawah and Jabal Humr. *Altitude*: 70–80 m. Endemic to the north-eastern part of the Masirah Island, in the northern part of the central mountains. Locally common.

Distribution map & Illustration: 450.

14. ***Euphorbia smithii*** S.Carter, Kew Bull. 40: 821 (1985).
Type: Oman, Dhofar, debouchment of Wadi Arzat onto Salalah coastal plain, 20 Sept. 1977, Radcliffe-Smith 5107 (holotype K).
Vernacular names: hiok (latex), hebshinut (tree, Jibbālī); hēbek (Ẓufari Arabic).

Description: Small tree, up to 5 m, deciduous; bark on the older branches peeling, brownish-red. Leaves alternate, 3–7 × 1.5–5 cm, obovate, apex rounded to minutely apiculate, base cuneate, margin entire, glabrous with sparse pubescence on the margins and veins, bluish-green above, pale green below. Cyathia terminal in groups of three, sessile to shortly pedunculate, white-hairy. Bracts subtending the cyathia ± 1 mm. Involucre cup-shaped, ± 4 mm long, 5–7 mm across. Cyathial glands 5, brownish- green; marginal lobes dentate. Male flowers with fimbriate bracteoles. Female flowers with ovary densely white-hairy. Capsule 8–9 mm in diameter, subglobose, obtusely 3-lobed, erect, ± sessile, densely white-hairy. Seeds globose, smooth.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, common on the lower altitudes of the escarpment mountains, with *Blepharispermum hirtum*; common. *Altitude*: 350–800 m. A regional endemic also found in SE Yemen.

Distribution map & Illustration: 451.

Notes: Because of its peeling bark, this species is often confused with *Commiphora* species when not flowering, but can be readily distinguished by the white latex which is absent in *Commiphora*.

15. ***Euphorbia cuneata*** Vahl, Symb. Bot. 2: 53 (1791).
Synonyms: *Tirucalli cuneata* (Vahl) P.V. Heath (1996).

Description: Shrub, up to 2 m tall, deciduous; branches with alternate spine-tipped branchlets at right angles to the main stem, bark grey to reddish-brown, peeling. Leaves alternate on young branches, fasciculate on the older branches, sessile, 5–22 × 3–5 cm, obovate, apex rounded, base long cuneate, margin entire, glabrous to sparsely pubescent. Cyathia axillary, in groups, erect, pedunculate, peduncle ± 5 mm. Bracts subtending the cyathia ovate-oblong, minutely ciliate. Involucre campanulate, ± 2 mm; cyathial glands 5, reddish; marginal lobes rounded, with a deeply fringed margin. Male flowers numerous, bracteoles laciniate. Female flowers with ovary subsessile, densely puberulous. Capsule 3–4(–6) mm in diameter, subglobose, obtusely 3-lobed, erect, sessile, white-pubescent.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, along the coastal plain in coastal wadis, in open *Acacia* scrubland. *Altitude*: 100–350 m. Distributed in tropical Africa (as far east as Mozambique), Sudan, Somalia. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map & Illustration: 452.

Notes: Apparently introduced as a hedge plant along the E African coast. Oman material is referable to subsp. *cuneata*. The name of this species is based on a specimen collected from Yemen (N) by Forsskål.

16. ***Euphorbia balsamifera*** Ait., Hort. Kew. ed. I. 2, 137 (1789).
subsp. ***adenensis*** (Deflers) Bally, Candollea, 20: (2): 390 (1974).
Basionym: *Euphorbia adenensis* Deflers (1887).
Vernacular names: da'amutteh (fruit), ja'amutti (fruit), kedūt, taḥeqot, taḥqot, tishkot, tishqot (Jibbālī); tikedoha (Ẓufari Arabic).

Description: Shrub, up to 1 m tall and about 1.5 m across, deciduous; branches spreading, soft and bent easily, bark grey and gnarled, brownish-grey, often covered with leaf scars. Leaves alternate, sessile, forming terminal rosettes, 1–2.5 × 0.5–1.5 cm, obovate to elliptical, apex rounded to minutely apiculate, base cuneate, margin entire, glabrous, bluish-green and often with pink margins. Cyathia terminal, solitary, apparently male and female, sessile. Bracts subtending the cyathia leaf-like. Involucre campanulate, 5–8 mm across in male and female flowers respectively; cyathial glands 5, yellow-green; marginal lobes fimbriate. Male flowers numerous, bracteoles fimbriate. Female flowers sessile, ovary glabrous. Capsule 8–9 mm in diameter, subglobose, erect, sessile, glabrous. Seeds globose, smooth.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, common along the length of the escarpment mountains and forming a transition zone between the wet, monsoon-affected mountains and

the drier north-facing slopes. *Altitude*: 600–850 m. Distributed in Somalia. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen. Also found on Soqotra on Abd al Kuri.

Distribution map & Illustration: 453.

Notes: The type subsp. *balsamifera* is distributed in NW Africa and the Canary Islands.

The latex (which is exuded in copious amounts when a cut is made in the stem) has been traditionally used as a depilatory and chewing gum, the latter still sold in the markets in Salalah (regional capital of Dhofar). The latex was also used as an adhesive. The leaves, buds and fruit have been used as a food source.

17. ***Euphorbia cactus*** Ehrenb. ex Boiss. in DC., Prodr. 15, 2: 82 (1862).
Vernacular names: zugher (Ẓufari Arabic, Jibbālī).

Description: Spiny shrub, up to 1 m; stems succulent, 1-3 branched from the base, ascending, strongly 3(–5)-angled, glabrous; ridges of angles undulating, bearing paired, 1–2 cm long, whitish-brown spines along the length of the ridges. Leaves 2–4 mm, ovate, soon falling. Cyathia axillary, sessile, in groups of 3, arranged along the upper part of the ridges, the central cyathium male and developing first, the lateral two bisexual. Bracts leaf-like, deciduous. Involucre cup-shaped, 8–9 mm across. Cyathial glands 5, yellow-green; marginal lobes with fimbriate margins. Male flowers numerous, bracteoles fimbriate. Female flowers subsessile, ovary glabrous. Capsule 7–9(–15) mm in diameter, subglobose, 3-lobed, erect, sessile, glabrous, reddish-brown when mature. Seeds subglobose, smooth.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, on the dry foothills of the escarpment mountains and occasionally found on the coastal cliffs of the wet escarpment mountains. *Altitude*: 300–850 m. Distributed in Ethiopia. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map & Illustration: 454.

Notes: The stems have been used as fodder for camels. The extract (latex) from the plant has been used in traditional medicine for treating skin conditions and toothache.

18. ***Euphorbia hadramautica*** Baker, Kew Bull. 1894: 341 (1894).
Synonyms: *Euphoria oblongicaulis* Baker (1895).
Vernacular names: kerţib a'adob, kerţib eda'an,, kerţib 'aduneb, kerţib 'adunib (Jibbālī).

Description: Small herb with cylindrical succulent stems 3–12 cm long and 1–2 cm in diameter, erect, unbranched, glabrous with spiral leaf scars. Leaves crowded at the apex of the stem, petiolate, 2–10 × 0.5–1.5 cm, linear-ovate to ovate, apex acute or obtuse, base cuneate, margin entire, undulate, glabrous; petiole 0.5–2 cm. Cyathia axillary, in small cymes, peduncle 3–10 mm. Bracts subrotund, sessile, sparsely hairy. Involucre campanulate, 11–15 mm across. Cyathial glands 5, green to pinkish, white-hairy; marginal lobes entire. Male flowers few, bracteoles linear, white-hairy. Female flowers with short pedicels, ovary densely hairy. Capsule 3–4 mm in diameter, subglobose, obtusely 3-lobed, erect, densely hairy with short crisped hairs, reddish-brown when mature. Seeds 4-angled, smooth.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, on the coastal plain, dry hills behind Raysut and north-facing foothills of the escarpment mountains, in the *Acacia-Commiphora* shrubland,

and occasionally found on the coastal cliffs of the wet escarpment mountains. *Altitude*: 50–550 m. Distributed in Somalia, Ethiopia and northern Kenya. Elsewhere in the Arabian Peninsula found in Yemen. Also found on Soqotra.

Distribution map & Illustration: 455.

Notes: The stems have been used in traditional medicine for treating skin conditions, the latex as plaster for setting bones and as a purgative. A small plant, easily overlooked.

The name of this species is based on a specimen collected from Yemen (Hadramaut) by W. Lunt (holotype K).

19. ***Euphorbia pirottae*** Terrac., Ann. Ist. Bot. Rom. 5: 97 (1894).
Synonyms: Euphorbia gorinii Chiov. (1932).

Description: Annual herb, 10–20 cm, with stem swollen and succulent below the inflorescence, smooth, pilose becoming glabrous. Leaves petiolate, blade up to ± 8 × 1 cm, lanceolate, apex rounded, base cuneate, margin entire; petiole ± 1 cm. Pseudumbel with 3 rays. Cyathia axillary, in cymes; peduncle 1–2 mm. Bracts oblanceolate to ovate, petiolate. Involucre campanulate, ± 2 mm across. Cyathial glands 4, green to reddish green. Capsule ±5 × 4 mm, subglobose, sparsely hairy. Seeds obscurely 4-angled, wrinkled.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, on the coastal cliffs, on limestone, in shaded locations in *Acacia-Commiphora* shrubland. *Altitude*: ?20–300 m. Distributed in Somalia, Ethiopia and Tanzania. Elsewhere in the Arabian Peninsula found in Saudi Arabia, ?Yemen.

Distribution map: 456.

Notes: This is not a common species in Oman. I have only seen a single collection from Dhofar.

20. ***Euphorbia longituberculosa*** Hochst ex Boiss. in DC., Prodr. 15, 2: 1264 (1866).

Description: Succulent perennial herb, 6–15 cm high; main stem cylindrical, 0.8–12 mm in diameter, ± erect, unbranched, glabrous with spiral leaf base scars (appearing as tubercles); annual stems arising from the apex of the main stem, sometimes becoming thick and succulent, simple or sparingly branched. Leaves sessile, 8–24 × 3–11 cm, lanceolate, apex acute or obtuse, base cuneate, margin entire, glabrous. Pseudumbels subterminal, 3-rayed, cymes lax; peduncle 1–2 mm. Bracts ovate. Involucre campanulate-cylindrical, 2–3 × 1.5–2 mm; margin deeply fringed. Cyathial glands 2, erect, yellowish; ovary glabrous, reddish green. Capsule 3–6 mm in diameter, on pedicel 2.5–3 mm, brown and reflexed when mature. Seed 3-angled with 2 faint transverse grooves, caruncle absent.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, on coastal cliffs, rocky slopes, in the *Acacia-Commiphora* shrubland. *Altitude*: 300–800 m. Distributed in Somalia, Ethiopia and northern Kenya. Elsewhere in the Arabian Peninsula found in Yemen (S).

Distribution map: 457.

Notes: This species is not common in Dhofar and so far known from only a few locations.

Under potential threat from collection by succulent enthusiasts. At present placed in the Data Deficient category on the National Red List.

21. ***Euphorbia orbiculifolia*** S.Carter, Kew Bull. 45(4): 653 (1990).
Type: Oman: Dhofar, Miller 6160 (holotype K; isotype E).

Description: Succulent perennial herb, to 20 cm; stem with few branches, covered with leaf-scars. Leaves clustered at the tips of branches, petiolate, 5.5–4 cm, suborbicular, entire; petiole ± 2 cm. Pseudumbels 2–3 with primary rays 6 cm, forking up to 4 times; cymes lax. Bracts sessile, suborbicular. Cyathial glands 3(–4), creamy white; lobes 5, margins deeply toothed. Capsule 4–5 mm in diameter, deeply 3-lobed, exserted, on pedicel ± 6 mm, reflexed when mature.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, in the foothills of the escarpment mountains. *Altitude*: 200–500 m. Endemic to Dhofar and SE Yemen (Al Mahra).

Distribution map & Illustration: 458.

Notes: The species is fairly restricted in its distribution, and so far known from a single locality. At present it is placed in the Vulnerable on the National List due to rapid development in the area where it known to occur. In facies it is similar to *Euphorbia longituberculosa*, but distinguished by its orbicular leaves, larger cyathia and 3–4 glands.

55. **Rhamnaceae** (by A. Patzelt)

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Key to the genera of Rhamnaceae in Oman

1. Plants with curved spines at the nodes (straight spines in *Z. hajarensis*); fruit with a single stone ..... **3. Ziziphus**
1. Plants unarmed or with straight spine-tipped branchlets; fruit with 2–3 stones
   2. Flowers 4-merous; disk 5-lobed ..... **1. Rhamnus**
   2. Flowers 5-merous; disk narrow, unlobed ..... **2. Sageretia**

1. **Rhamnus** L.

About 125 species, distributed throughout the north temperate, subtropical and tropical regions.

Rhamnus staddo A. Rich., Tent. Fl. Abyss. 1: 138 (1847).
Vernacular names: ḥagor mītayn (Zufari Arabic, Jibbāli), jiberit moṭin, jiferit moṭin (Jibbāli).

Description: Deciduous shrub or small tree, up to 3 m tall, unarmed but with branches becoming spine-tipped. Bark smooth, grey; year-old branches dark brown-grey; youngest twigs

densely to sparsely hispidulous with grey hairs; short shoots often produced late in the growing season. Leaves alternate or whorled on side-shoots, simple, dark olive green or brown-green, 0.8–2.7(–4.4) × 0.3–1.3(–20) mm, ovate to elliptic to ovate-oblong, glabrous or glabrescent, glabrous or hispid on the major nerves beneath and occasionally above or rarely hispid on both surfaces, apex mucronate, base attenuate to cuneate, margin obscurely serrulate; petiole (1–)2–6(–8) mm. Stipules filiform to subulate, 1–3 mm. Flowers small, inconspicuous, pale yellow, unisexual or hermaphrodite (then dioecious), solitary, often appearing at the nodes of the short shorts of the previous season, thus in somewhat fascicle-like aggregations, fragrant. Sepals 1.5–2 mm long. Petals 0.5–1 mm, soon falling. Stamens 4. Ovary globose. Fruit (drupe) 4–7 mm in diameter, subglobose, first yellow, then red, blackish purple when ripe, with 3 stones or by abortion fewer.

Flowering and fruiting: September.

Distribution and habitat: Southern Oman, Dhofar, on the escarpment mountains, in the drier woodland, frequently growing beside *Olea* trees. *Altitude*: 350–800 m. Distributed in Kenya and Ethiopia. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map & Illustration: 459.

Notes: A fairly common shrub in Dhofar, but has been undercollected, with very little material from Oman. The wood has been used in the construction of huts.

2. **Sageretia** Brongn.
35 species, distributed from NE Africa (Ethiopia and Somalia) through Arabia to Turkey and Iran and to China and Eastern Asia and tropical Asia to Australia, S USA to Colombia and south to Bolivia and Paraguay.

Sageretia thea (Osbeck) M.C.Johnston, J. Arn. Arb. 49: 378 (1968).
Basionym: *Rhamnus thea* Osbeck (1757).
Synonyms: *Rhamnus theezans* L. (1771); *Sageretia theezans* (L.) Brongn. (1826); *Sageretia spinosa* Wettst. (1890); *Sageretia brandrethiana* Aitch. (1865); *Rhamnus spiciflora* A.Rich. (1847); *Sageretia spiciflora* (A.Rich.) Hutchinson & E.A. Bruce (1941).
Vernacular names: nimt.

Description: Evergreen shrub, up to 2 m, with intricate branches ending in spines. Leaves alternate to subopposite, (5–)10–25(–38) × (3–)7–18(–32) mm, ovate to ovate-elliptic, apex acute or mucronate, base acute, margin subentire to minutely serrrulate, glabrous to scabrid on petiole and midrib; petiole 1–6 mm. Flowers pale yellow to cream, in short terminal spikes. Calyx saucer-shaped, 5-lobed, lobes ± 1.5 mm, ovate. Petals ± 1 mm, obovate, equalling the stamens. Stamens 5. Disc narrow, surrounding the ovary, unlobed. Fruit (berry) 4–6 mm long and broad, ovoid to subglobose, dark red to black when ripe, fleshy, sweet to taste, edible.

Flowering and fruiting: May to July.

Distribution and habitat: Northern Oman, in the eastern and western Hajar mountains, in gorges and summit plateau, in evergreen scrub with *Olea* and *Juniperus*. *Altitude*: 1500–2500 m. Widely distributed from NE Africa (Somalia, Ethiopia, Eritrea), Egypt, Turkey, southern Iran, Afghanistan, SW Pakistan and China through to Japan. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map & Illustration: 460.

Notes: The fruit is well known to local inhabitants, especially those living in the mountains, and is eaten as a refreshing snack. Not sold in the local market during season, but often collected and taken home to be eaten.

3. **Ziziphus** Mill.

Distributed from the Mediterranean region east to China and Korea, and through tropical Africa and Asia to South Africa, Australia, Mexico south to NW Argentina.

1. Stipular spines dimorphic, one hooked and the other straight
   2. Trees, rarely shrubby; branches not zigzagging; leaves petiolate, generally longer than 1 cm; floral disc grooved, not pitted ..... 1. **Z. spina-christi**
   2. Shrubs; branches strongly zigzagging; leaves sessile to shortly petiolate, generally smaller than 1 cm; floral disc pitted
      3. Bark brown; leaves not in fascicles, orbicular to ovate-orbicular, densely pubescent above, tomentose beneath ..... 2. **Z. nummularia**
      3. Bark distinctly whitish-brown; leaves often in fascicles on short shoots, oblong-elliptic, glabrous or with sparse hairs ..... 3. **Z. leucodermis**
1. Stipular spines uniform, straight, equal in length (shrub or tree, often multi-stemmed, mature branches held perpendicular to the main trunk; young branches mahogany-red with a pronounced zigzag pattern ..... 4. **Z. hajarensis**

1. ***Ziziphus spina-christi*** (L.) Desf., Fl. Atl. 1: 201 (1798).

Basionym: *Rhamnus spina-cristi* L. (1753).

Synonyms: *Ziziphus africana* P. Mill. (1768); *Rhamnus nabeca* Forssk. (1775); *Ziziphus nabeca* (Forssk.) Lam. (1789); *Z. spina-christi* (L.) Desf. var. *inermis* DC. (1825); *Z. spina-christi* (L.) Desf. var. *longipes* Engl. (1921); *Z. spina-christi* (L.) Desf. var. *mitissima* Chiov. (1932).

Vernacular name: sidr, 'ibri, sidr meseydrāni, nabaq (fruit); 'ilb (Ẓufari Arabic, Jibbālī), zēd (Jibbālī).

Description: Tree or large shrub, up to 10 m tall; bark grey to brown. Branches spiny, often zigzagging, thinly hairy when young; spines one of each pair straight up to 2.5 cm long, the other shorter and hooked (up to 0.5 cm long). Leaves alternate, 3-nerved from the base, 2–4(–6) × 1.5–3 cm, ovate to elliptic, glabrous or thinly hairy beneath along the veins, apex acute to rounded, base rounded to subcordate, margin finely crenate-serrate; petiole (3–)10–15(–20) mm. Inflorescences a dense cymose cluster in the axils of the leaves (5–)10–25-flowered; peduncles 1–2 mm long. Flowers yellowish-green, finely pubescent. Sepals ± 1.5 × 2 mm. Petals ± 1.5 × 1 mm, hooded at apex. Disk 10-lobed. Stamens 5. Ovary 2-locular. Fruit (drupe), ± 1–1.5 cm in diameter, globose, glabrous, yellowish or reddish- brown when ripe. Seeds obovate, brown.

Flowering and fruiting: September to November, the fruits persisting on the trees for a long time.

Distribution and habitat: Throughout Oman, in wadis, sandy and gravel plains, in open woodland and scrub, near settlements in disturbed areas, and often along roadsides; also widely planted. *Altitude*: 20–1400 m. Widespread from NE Africa westwards to NW India. Elsewhere in the Arabian Peninsula found in Bahrain, Kuwait, Qatar, Saudi Arabia, UAE, Yemen. Also found on Soqotra.

Distribution map & Illustration: 461.

Notes: A common plant of the wadis and plains; frequently cultivated with fruits sold locally in

village markets. The leaves have long been used as soap and powdered leaves as shampoo, a use still common today. Leaves, seeds and bark have been used for medicinal treatments.

The 'sidr' tree is mentioned several times in the Qur'an: in a description of paradise (LVI: 14, 16), of a garden (XXXI: 15) and as a landmark associated with a vision of the Prophet (LIII: 14, 16).

2. ***Ziziphus nummularia*** (Burm. f.) Wight & Arn., Prodr. 162 (1834).
Basionym: *Rhamnus nummularia* Burm. f. (1768).

Description: Branched shrub with many ascending stems, up to 1.5(–3) m tall; branches intricate and zigzag in growth pattern, hairy to white-tomentose on younger parts. Spines one of each pair straight (± 1 cm), the other shorter and hooked. Leaves 0.8–20 × 0.5–18 mm, 3-nerved from the base, ovate to ovate-orbicular, hairy or finely tomentose, especially on the undersurface, base rounded, apex rounded, retuse or mucronate, margin entire to crenulate; petiole 2–5 mm, tomentose. Flowers axillary, greenish-yellow; pedicels 5–10 mm. Sepals triangular, grey-tomentose. Petals obovate, as long as the sepals. Disk 10-lobed. Fruit (drupe) 7–8 mm in diameter, globose, orange to red.

Flowering and fruiting: March to April.

Distribution and habitat: Northern Oman, at the northern edge of Wahiba Sands, in sandy wadis. *Altitude*: ± 200 m. Distributed from NE Africa to India. Elsewhere on the Arabian Peninsula found in Bahrain, Qatar and Saudi Arabia.

Distribution map: 462.

3. ***Ziziphus leucodermis*** (Baker) O. Schwartz, Mitt. Inst. für Allg. Bot. Hamburg 10: 152 (1939).
Vernacular names: ḥabḍīt (pl.), ḥaybeḍ, ḥēbe,(Ẓufari Arabic, Jibbālī, Harsūsī); ḥabaḍah, ḥabḍ, ḥiḍit (Harsūsī, Jibbālī).

Description: A small intricately spiny branched shrub, up to 2 m tall, bark white. Branches strongly zigzagging, thinly hairy when young; spines one of each pair straight (up to 2 cm long) the other shorter and hooked (up to 0.5 cm long). Leaves alternate or fascicled, obscurely 3-nerved from the base, 5–15 × 2–5 cm oblong-elliptic, apex rounded or retuse, base rounded, margin entire. Flowers yellowish-green, in lax clusters in the axils of leaves. Sepals 2–2.5 × 1.5–1.8 mm, thinly hairy. Petals ± 2× 0.5 mm, hooded at apex. Disk 10-lobed. Stamens 5. Ovary 2-locular. Fruit (drupe), 5–7 mm in diameter, globose, glabrous, dark orange. Seeds strongly compressed, with a pointed tip, ± 4.5 × 4 mm, pale brown.

Flowering and fruiting: March to May.

Distribution and habitat: Central and Southern Oman, in the drier areas, in gravelly wadis and plains, and on the limestone plateau of Jiddat Al Harasīs. *Altitude*: 200–750 m. A regional endemic, elsewhere in the Arabian Peninsula found in SE Yemen.

Distribution map & Illustration: 463.

Notes: The leaves have been used in traditional medicine to treat swellings, inflammations and snake bites, and the fruits have been an important food source.

4. ***Ziziphus hajarensis*** Duling, Ghaz. & Prendergast, Kew Bull. 53(3): 733 (1998).
Type: Oman, Eastern Hajar Mountains, Jebel Bani Jabir, 1400 m, 28 March 1996, D.W. Duling 85 (holotype K, isotypes OM, RNG, SQU-H (Sultan Qaboos University Herbarium)).

Vernacular names: qaşam, qaşum.

Description: Shrub or small tree, up to 5 m; branches held perpendicular to the main stems, branchlets glabrous; young branches mahogany-red, strongly zigzag. Stipular spines straight, 7–23 mm. Leaves alternate, 3-nerved from the base, 8–14 × 14–57 mm, lanceolate-ovate, apex acute to retuse, base unequal, margin entire, glabrous, dark green above, paler beneath; petiole 2–20 mm, densely pubescent. Inflorescence axillary, of pedunculate cymes, densely pubescent. Pedicel 7–8 mm. Flowers 5-merous. Sepals 1.5–2 mm, glabrous above, densely tomentose below. Petals white, slightly longer than the sepals. Ovary densely tomentose at base, becoming glabrous. Disc 10-lobed. Drupe 10–25 mm in diameter, globose, glabrous, orange-yellow, fibrous. Seed compressed.

Flowering and fruiting: April; fruiting May to June.

Distribution and habitat: Northern Oman, in the Hajar mountains, in open *Olea–Sideroxylon* woodland, and at a few locations in the Jebel al Akhdar with *Juniperus*; in the Eastern Hajar it forms open woodland with *Ceratonia oreothauma* subsp. *oreothauma* and *Prunus arabicus*. *Altitude*: 900–2200. Endemic to Oman.

Distribution map & Illustration: 464.

Notes: The fruit and kernels are eaten fresh by local people (the fruits persist for several months on the trees). The branches are stripped of their bark and used as axe handles for lowering and cutting leaves off trees for goat fodder by the local inhabitants in the Jebel Bani Jabir area (eastern Hajar). Chromosome number 2n=24.

Wild-collected seed of this species is held at the Millennium Seed Bank at Wakehurst Place, Royal Botanic Garden, Kew.

56. **Vitaceae** (by A. Patzelt)

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Key to the genera of Vitaceae in Oman

Leaves simple; flower-buds ovoid to conical, not constricted near the middle; nectary disc annular . . . . . 1. **Cissus**

Leaves (1–)3–7-foliolate; flower-buds cylindrical or flask-shaped, constricted at or near the middle; nectary disc divided into 4 separate glands . . . . . 2. **Cyphostemma**

1. **Cissus** L.

About 250 species, distributed from Senegal to Arabia, south to South Africa, Madagascar and Mascarene Islands; China and tropical Asia to Solomon Islands and Australia, Florida south to Chile and Argentina.

Stems 4-angled; leaves ovate to triangular ..... 1. **C. quadrangularis**
Stems terete; leaves ± rotund ..... 2. **C. rotundifolius**

1. ***Cissus quadrangularis*** L., Syst. Nat., ed. 12, 2: 124 (1767).
Vernacular names: ʿaṯere, ḥatrāyyeh (Ẓufari Arabic, Jibbālī); ʿaṯerér, ʿuṯeráyyeh (Jibbālī); ʿaterayyeh (Ẓufari Arabic).

Description: Perennial succulent liana or becoming shrubby with prostrate stems climbing over other shrubs and rocks, up to 5 m long; stems 4-angled, slightly winged, jointed and constricted at the nodes, frequently leafless, glabrous, often tinged reddish; old stems becoming woody with grey bark. Leaves alternate, petiolate, fleshy, simple, sometimes palmately 3-5-lobed, 3–7 × 3–9 cm, ovate to triangular, base cordate, apex rounded, margin dentate, glabrous, often tinged red on the margins; petiole 1–6 cm long, glabrous; tendrils opposite the leaves, simple, 6–10 cm. Inflorescences cymose, numerous on the young branches, (2–)4–10 cm; peduncle 0.1–2(–3.5) cm. Flowers white or cream to yellowish green, ± 3 mm across. Sepals 1× 2–2.5 mm. Petals 4, triangular-ovate. Stamens 4. Ovary 2-locular. Fruit (berry), obovoid to globose, ± 8 mm in diameter, fleshy, bright red or violet when ripe, 1(–2) seeded, glabrous.

Flowering and fruiting: September to January.

Distribution and habitat: Southern Oman, Dhofar, at lower altitudes on the escarpment mountains, coastal plains and wadis, in dry woodland and scrub, climbing over other plants and rocks. *Altitude*: 100–1000 m. Distributed throughout tropical Africa, southern Arabia, India, Sri Lanka, Myanamar, extending to the Philippines. Elsewhere in Arabia found in Saudi Arabia, Yemen.

Distribution map & Illustration: 465.

Notes: Widespread and common at lower altitudes especially on coastal plains, but becoming less common above 800 m. A species variable in the shape of leaves with some plants having almost rotund leaves, more or less similar to those in *C. rotundifolia*. Miller 2416 (K) identified as *C. rotundifolia* is referable to *C. quadrangularis*. *C. quadrangularis* has been used in traditional medicine to treat skin infections and mastitis in livestock. The species is in cultivation at the National Botanical Garden, Sultan Qaboos University, Oman from wild-collected material from Dhofar.

2. ***Cissus rotundifolia*** (Forssk.) Vahl, Symb. Bot. 3: 19 (1790).
Basionym: *Saelanthus rotundifolius* Forssk. (1775).

Description: Robust climber or scrambler with stems becoming woody at base, up to 6 m or more long; stems terete, but older branches often becoming 4-angled or winged, pubescent or glabrescent; tendrils opposite the leaves, simple or bifid, 6–10 cm. Leaves alternate, petiolate, fleshy, simple, 4–7 × 4–8 cm, broadly ovate to rotund, base cordate, apex rounded, margin irregularly to coarsely dentate, glaucous; petiole 1–2 cm long, glabrous. Inflorescences of panicles of umbellate cymes, 4–10 cm; peduncle 0.5–2 cm, glabrescent. Flowers yellowish green, ± 3 mm across; pedicel ± 5 mm, elongating in fruit. Sepals ± 1.5 mm. Petals 4, ± 3 mm, oblong-ovate. Stamens 4. Ovary 2-locular. Fruit (berry), 5–8 mm in diameter, obovoid to globose, fleshy, red to purple when ripe, 1(–2) seeded, glabrous.

Flowering and fruiting: September to January.

Distribution and habitat: Southern Oman, Dhofar, on the escarpment mountains, coastal wadis and plains; not common. *Altitude*: 100–1000 m. Distributed from Somalia east to the

Democratic Republic of the Congo, East Africa south to South Africa. Elsewhere in Arabia found in Saudi Arabia and Yemen.

Notes: This species is probably overlooked due to its resemblance to *C. quadrangularis*. In 1997 the plant was in cultivation at the National Botanical Garden, Sultan Qaboos University, Oman from wild-collected material from Dhofar. Its occurence should be confirmed by recollecting. The name of this species reflects the morphology (rotund leaves) of the syntypes colllected from Yemen (Surdud) by Forsskål (C).

2. **Cyphostemma** (Planch.) Alston
About 150 species distributed from Senegal to Somalia and Arabia and south to South Africa, Comoros, Madagascar, Mauritius, S India and Sri Lanka.

Cyphostemma ternatum (Forssk.)Desc., Notul. Syst. (Paris) 16: 125 (1960).
Basionym: *Saelanthus ternatus* Forssk. (1775).
Synonyms: *Vitis apodophylla* Bak. (1894); *Cissus somaliensis* Gilg (1905, in part); *Cissus bryophyllum* Mattei (1908).
Vernacular name: kūm, qūm (Ẓufari Arabic, Jibbālī).

Description: Perennial robust trailing or climbing herb, up to 2 m long; stems succulent, round in section, ± 4 mm in diameter, glabrous. Leaves alternate, ± sessile, fleshy, stipulate, 3–5-foliolate; leaflets, 2–15 × 1–7 cm, oblong to ovate, apex rounded or obtuse, sessile or sometimes with short petiole up to 1 cm long, margin crenate-serrate, glabrous; stipules paired, red-tipped; tendrils opposite the leaves, simple or bifid, up to 25 cm long. Flowers pale yellowish green, 2.5–3 mm long, arranged opposite the leaves in long pedunculate axillary cymes. Sepals 4, 2.5 mm wide. Petals 4, ± 0.2 × 1.25 mm, tip hooded. Stamens 4. Ovary 2-locular. Fruit (berry), 0.6–1 cm across, ovoid or globose, ripening bright red, glabrous, 1-seeded.

Flowering and fruiting: August to December.

Distribution and habitat: Southern Oman, in wadis and summit grassland of the wet escarpment mountains, in rocky and open areas, along track roads, trailing and climbing over other plants. *Altitude*: 100–950 m. Distributed from tropical NE Africa to southern Arabia. Elsewhere in the Arabian Peninsula found in Saudi Arabia and Yemen.

Distribution map & Illustration: 466.

Notes: The plant has been used in traditional medicine to treat foot infections in humans and livestock. It has also been an important source of food in earlier times.

57. Linaceae

Linum L.
About 180 species, throughout north temperate regions, in tropical African highlands to South Africa, Australia and New Zealand; Alaska to N Argentina and C Chile .

Linum corymbulosum Reichnb., Fl. Germ. Excurs.: 834 (1832).
Synonyms: Linum strictum L. var. *corymbulosum* (Reichnb.) Planch. (1848); *L. strictum* L. subsp. *corymbulosum* (Reichnb.) Rouy (1897).

Description: Erect annual herb, 10–40 cm, with simple or branched stems, usually simple at the base. Leaves alternate, ascending, sessile, 7–24 × 1 mm, linear-lanceolate, apex acute, margin

entire to minutely denticulate, scabrid, grey-green. Flowers in pedunculate dichasial cymes; pedicel 2–5 mm, filiform. Calyx 4–5 mm, lanceolate, hyaline at the base, glandular-ciliate, persistent. Petals yellow, 3.5–4 mm. Stamens 5; staminodes 5, placed in between the stamens. Capsule ± 2 mm in diameter, globose, yellow-brown, splitting into 10, 1-seeded portions.

Flowering and fruiting: March to May.

Distribution and habitat: Northern and southern Oman, including Musandam, on the mountains, amongst stones, in sandy and gravelly depressions; in Dhofar on the escarpment mountains in grassland and in the *Euphorbia balsamifera* zone. *Altitude*: 800–2200 m. Distributed in S & E Europe, Cyperus, E tropical Africa, and from N Africa to Pakistan, and C Asia. Elsewhere in the Arabian Peninsula distributed in Saudi Arabia and Yemen.

Distribution map: 467.

Notes: Not common; an escape from cultivation from former times.

58. Malphigiaceae

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Acridocarpus

About 30 species distributed in Africa, Madagascar, India and New Caledonia.

Acridocarpus orientalis A. Juss., Monogr. Malphig.: 234 (1843).
Type: Mascut [Muscat, Oman] 4294 (MO).
Vernacular names: qafaş, khayēsī (in the Batinah region, but not a commonly used name); ʿeţbot, ʿeyţib, ʿeyţot, ʿeţiyot (Jibbālī).

Description: Large shrub or tree, up to 6 m; stems with bark whitish brown. Leaves alternate, 6–12 × 2–4 cm, elliptic to ovate-elliptic, margin entire, apex acute to obtuse, base cuneate, pubescent particularly on veins with reddish-brown hairs, becoming glabrous. Flowers yellow, in dense terminal racemes; pedicels ± 2 cm, red tomentose. Sepals 5, free, ± 6 × 4.5 mm, oblong-ovate, with 1 or 2 glands at the base. Petals ± 13 × 8 mm, broadly ovate, shortly clawed, tip rounded and somewhat fimbriate. Stamens 10; anthers sessile, dehiscing by apical pores. Styles 2, curving upwards. Fruit with reddish- to pale brown wings, wings obliquely ovate, 3.4–4.5 cm long, with soft hairs, breaking into 1-seeded portions at maturity.

Flowering and fruiting: April to June.

Distribution and habitat: Throughout Oman, but excluding Musandam, common on wadi banks and lower slopes of the mountains, in gravelly locations. *Altitude*: 300–800 m. Distributed from NE Africa to Arabia. Elsewhere in the Arabian Peninsula found in Saudi Arabia, UAE, Yemen.

Distribution map & Illustration: 468.

Notes: Oil extracted from the seeds, and extract of leaves, has been used in northern Oman in traditional medicine for chronic headaches, massaging on paralysed limbs, and for muscle and

tendon pains. The extraction of oil from the small seeds is an arduous task carried in only a few villages in the western Hajar mountains. New growth and underbark has been used as a tanning agent in Dhofar.

59. Polygalaceae

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Polygala L.

About 270 species, cosmopolitan but chiefly in tropical and subtropical regions.

In *Polygala* the sepals are unequal and persistent, the inner 2 larger, petaloid and envelope the petals, stamens and ovary and fruit; the 2 lateral petals are joined to the united stamens, the lower petal is boat-shaped (keel), and encloses the stamens and the ovary, and is fringed at the apex (crest). Capsule and seed are important in the identification of species.

1. Leaves linear to linear-oblong
   2. Capsule narrowly winged with wings < 1 mm wide
      3. Annual or short-lived perennial herbs; seed with long hairs, caruncle appendage absent ..... 1. **P. erioptera**
      3. Perennial subshrub; seeds with long hairs, caruncle asymmetric extending shortly along one side of seed, appendages obscure ..... 5. **P. abyssinica**
   2. Capsule broadly winged with wings > 1 mm wide
      4. Capsule with unequal wings, or sometimes wings ± equal; seed without bead-like papillae at apex
         5. Annual herbs, glabrous; caruncle humped, appendage obscure .... 2. **P. dispar**
         5. Perennial herbs or subshrubs; pubescent; caruncle asymmetric extending shortly along one side of seed, appendage obscure ..... 5. **P. abyssinica**
      4. Capsule with equal wings; seed with bead-like papillae at apex .. 3. **P. irregularis**
1. Leaves obovate to broadly obovate
   6. Capsule narrowly winged with wings <1 mm wide or wings lacking
      7. Inner sepals 9–10 mm, sub-rotund, ciliate, yellow with distinct purple and green veins; seed with caruncle appendages extending down to almost the length of the seed ..... 7. **P. senensis**
      7. Inner sepals 7–7.5 mm, sub-rotund, glabrous, purple-pink with dark purple veins; seed with caruncle appendages extending to about 1/4 of seed length ..... 4. **P. mascatensis**
   6. Capsule broadly winged with wings > 1 mm wide ..... 6. **P. dhofarica**

1. ***Polygala erioptera*** DC., Prodr. 1: 326 (1824).

Synonyms: *Polygala paniculata* Forssk. (1775), nom. nud., non L. (1795); *P. schimperi* Hassk.

(1864).
Vernacular names: shkhēmet ghazal (Harsūsī).

Description: Annual or short-lived perennial, up to 20(–30) cm, with or without a woody stock; stems branching from the base, erect to ascending or sometimes prostrate, white-pubescent. Leaves alternate, 5–15(–20) × 1–2 mm, linear to linear-oblong, apex acute, base cuneate, margin entire, pubescent; petiole ±1 mm. Flowers in small lateral racemes. Sepals persistent, the outer 3 sepals 1–1.5 mm; inner 2 sepals 5–6 mm, broadly ovate to sub-rotund, yellow-green, pubescent outside, 3-nerved in fruit. Petals with the crest of keel purplish-pink. Capsule 4–5 × 3–4 mm, elliptic-oblong, notched above, compressed, pubescent and ciliate, narrowly winged on all sides, enclosed by the larger inner sepals. Seeds with long hairs, caruncle conical, appendages absent.

Flowering and fruiting: February to May; September to October.

Distribution and habitat: Throughout Oman, including Masirah island, in sandy and gravelly wadi beds, gravel plains, sandy depressions; a common annual after rain. *Altitude*: 20–2000 m. Distributed in tropical Asia, Africa and Arabia. Elsewhere in the Arabian Peninsula found in Qatar, Saudi Arabia, UAE, Yemen. Also found on Soqotra.

Distribution map & Illustration: 469.

Notes: A variable species found in most habitats in Oman.

2. ***Polygala dispar*** Ghaz., Edinb. J. Bot. 51(1): 59–63 (1994).

Type: N Oman, Ruwi hills, 200 m, 27 March 1992, S.A. Ghazanfar 1828 (holotype ON; isotype SQUH, Sultan Qaboos University Herbarium).

Description: Annual herb up to 35 cm; stems branching sparsely, erect, glabrous. Leaves alternate, 13–37 × 0.5–1.5 mm, linear to linear-oblong, apex acute, base cuneate, margin entire, glabrous; petiole ±1 mm. Flowers in terminal racemes; pedicel 2–2.5 mm, recurved when fruit is mature. Sepals persistent, the outer 3 sepals 3–4.5 mm, obovate; inner 2 sepals 6–7 mm, obovate to ovate, yellow-green, distinctly 3-veined at the base, glabrous. Petals with the crest of the keel purple. Capsule ± 5 × 2 mm, oblong, notched above, compressed, with markedly unequal wings, glabrous; larger wing 2 mm at the apex, smaller wing 0.5 mm, glabrous, enclosed by the larger inner sepals. Seeds with long hairs, caruncle humped, appendage obscure.

Flowering and fruiting: March to April.

Distribution and habitat: Northern Oman, in the foothills of the western Hajar, in gravelly wadis and hill slopes. *Altitude*: 40–200 m. Endemic and so far known only from northern Oman.

Distribution map: 470.

Notes: This species is closest to *P. crioptera*, and may be regarded by some authors as a variant of that species; I have examined all the material from Oman, and have found the capsule characters to be distinct and constant.

3. ***Polygala irregularis*** Boiss., Diagn. Pl. Or. Nov. 1:, 1: 8 (1843) & Fl. Or. 1: 469 (1867). *Synonyms: Polygala arabica* Boiss. (1843). *P. irregularis* var. *arabica* Boiss.(1867); *P. irregularis* var. *cordofana* Chodat (1893).

Description: Perennial herb or sub-shrub, up to 20 cm, with a woody stock; stems several arising from the base, sparsely branched, erect to ascending, sparsely pubescent to glabrous. Leaves alternate, grey-green, 6–10 × 1 mm, linear, apex acute, base cuneate, margin entire, pubescent; petiole ± 1 mm. Bracts and bracteoles deciduous. Flowers solitary, distantly placed on the flowering shoot; pedicel ± 2 mm. Sepals persistent, the outer 3 sepals ± 2 mm, broadly ovate with 3 green veins and a broad white-scarious margin; inner 2 sepals 5–5.5 mm, sub-rotund, shortly clawed, pale yellow-green, with distinct green-purple veins, pubescent. Petals deep purple, crest of the keel purple. Capsule 4–5 × 4–5 mm, ovate-oblong, notched above, compressed, glabrous, broadly winged on all sides; wings ± 1.5 mm, glabrous, pink tinged, purple-veined, enclosed by the larger inner sepals. Seeds with bead-like papillae on the apex, hairs short, caruncle appendage short.

Flowering and fruiting: February to March.

Distribution and habitat: Northern and Central Oman, in the foothills of the mountains, in gravelly wadi beds and banks. *Altitude*: 50–150 m. Distributed in NW and NE Africa, Arabia. Elsewhere in the Arabian Peninsula found in Qatar, Saudi Arabia, Yemen. Expected to occur in UAE.

Distribution map & Illustration: 471.

4. ***Polygala mascatensis*** Boiss., Fl. Orient. 1: 470 (1867).
Type:[Oman], Mascate, Aucher-Eloy 4201 (syntype K, P, W).

Description: Small low shrub, up to 40 cm, with intricate branching, white-pubescent; branches ending in spines, grey-green. Leaves alternate, grey-green, 4–8 × 2–5 mm, broadly ovate to obovate, apex rounded to retuse, base cuneate, margin entire, pubescent; petiole ± 0.5 mm. Flowers solitary, in the axils of leaves; pedicel ± 1mm. Sepals persistent, the outer 3 sepals 1.5–2 mm, lanceolate, appressed white-pubescent; inner 2 sepals 7–7.5 mm, sub-rotund, shortly clawed, yellowish pink to purple-pink with stronger purple veins, glabrous. Petals ± 1.5 mm with the crest of the keel purple. Capsule 6–7 × 4–5 mm, ovate-oblong, notched above, compressed, glabrous, without wings, pubescent, enclosed by the larger inner sepals. Seeds with dense, short hairs, caruncle humped, appendages short to about 1/4 the seed length.

Flowering and fruiting: February to July; also September to November.

Distribution and habitat: Northern Oman, in the foothills of the western Hajar mountains, in gravelly wadi beds and banks, with *Euphorbia larica*, *Acacia tortilis* and other foothill vegetation. *Altitude*: 50–1900 m. A regional endemic, extending from northern Oman to the hills in the UAE.

Distribution map & Illustration: 472.

5. ***Polygala abyssinica*** R. Br. ex Fresen., Mus. Senckenberg 2: 273 (1837).

Description: Perennial herb or sub-shrub, up to 30 cm, with a woody base; stems several arising from the base, sparsely branched, erect to ascending, sparsely pubescent to glabrous, often becoming leafless. Leaves alternate, grey-green, 15–25(–40) × 2–4 mm, linear to occasionally linear-obovate, apex acute, sometimes with a small mucro, base tapering into a very short petiole, margin entire, pubescent. Bracts and bracteoles deciduous. Flowers pinkish, in terminal racemes; pedicel 2–3 mm. Sepals persistent, the outer 3 sepals 3–3.5 mm, green with white-scarious margin; inner 2 sepals ± 5 × ± 4 mm, broadly obovate to elliptic, greenish-

yellow with dark purple-brown veins, glabrous. Petals deep purple, crest of the keel pink-purple. Capsule 4–5 × 4–5 mm, oblong-ovoid, compressed, glabrous, narrowly winged on all sides or sometimes wings broader and ± unequal, enclosed by the larger inner sepals. Seeds with long hairs, caruncle asymmetric extending shortly along one side of seed, appendages obscure.

Flowering and fruiting: September.

Distribution and habitat: Distributed in northern and southern Oman, in open locations, rocky slopes; in northern Oman, on the summit areas with *Juniperus*, *Lonicera* and *Euryops*; in Dhofar with *Acacia*, *Commiphora*. *Altitude*: 1000–3000 m. Distributed in E and NE Africa (Tanzania, Kenya, Uganda, Sudan, Somalia, Ethiopia, Djibouti), Arabia, Afghanistan, Pakistan. Elsewhere in the Arabian Peninsula found in Saudi Arabia, UAE, Yemen. Also found on Soqotra.

Distribution map & Illustration: 473.

Notes: A widespread species; the wings of the capsule are variable from being equal to slightly unequal, either narrow or broad. Some of the Oman material approaches *P. rupicola* A. Rich., but as there are variations in capsule wing width and leaf-size in *P. abyssinica*, I have preferred to keep all Oman material under this taxon (see also Gilbert in Fl. Ethiop. 2(1): 185 (2000)). Material identified as *P. dhofarica* (Miller & Whitcombe 2789 from Jebel Kawr) is referable to *P. abyssinica*.

6. ***Polygala dhofarica*** Baker, Kew Bull. 1895: 181 (1895).
Type: Oman, Dhofar mts., 300 ft., *Bent* 186 (holotype K).
Vernacular names: ḥalálnut (Jibbālī).

Description: Perennial herb, up to 40 cm, with a woody base; stems several arising from the base, erect to ascending, crisped-pubescent to glabrous. Leaves alternate, grey-green, 5–15 × 2–4 mm, oblong-elliptic to lanceolate, apex acute with a small mucro, base cuneate, margin entire, sparsely shortly crisped-pubescent; petiole ±1 mm, pubescent. Flowers in terminal racemes; pedicel ± 1.5 mm, glabrous; bracts and bracteoles glabrous, soon falling. Sepals persistent, the outer 3 sepals ± 3 mm, glabrous; inner 2 sepals 7–7.5 mm, elliptic, reddish-purple, glabrous. Petals purple, crest of the keel purple. Capsule 5–5.5 × 5–6 mm, obovoid, compressed, glabrous, broadly winged on all sides; wings 1.5–2 mm broad, glabrous, enclosed by the larger inner sepals. Seeds with long silky hairs; caruncle appendages short.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar on the escarpment mountains on the seaward face, in rocky habitats, open hill slopes and coastal cliffs, with *Acacia etbaica*, *Dracaena serrulata* and also in the *Euphorbia balsamifera* zone. *Altitude*: 900–2900 m. A regional endemic found in N Yemen. and extending to the Dhofar mountains.

Distribution map: 474.

Notes: The limited material that I have seen from northern Oman (Jebel Akhdar and Jebel Khawr) identified as P. *dhofarica* approaches *P. abyssinica* in its capsule and seed characters, and I am inclined to think that it is a variation of *P. abyssinica* rather than *P. dhofarica*.

6. ***Polygala senensis*** Klotzsch in Peters, Reise Mossamb. Bot. 1: 113 (1861)
var. ***senensis***

Synonyms: *Polygala obtusissima* Hochst. ex Chodat (1893).
Vernacular names: edādh, edodh, edodhe, ḥerum ēzeraḥ (Jibbālī; also used for other *Polygala* spp.).

Description: Perennial herb or low shrub, up to 45 cm, with a woody stock; stems several arising from the base, branched, erect to ascending, pubescent. Leaves alternate, green, 10–27 × 5–10 mm, obovate, apex rounded, base cuneate, margin entire, pubescent; petiole sessile to ±1 mm. Flowers in terminal and axillary racemes, subtended by small ovate, acuminate pubescent bracts; pedicel 4–6 mm, pubescent. Sepals persistent; outer 3 sepals 3–4 mm, ovate to oblong-ovate; inner 2 sepals 9–10 × 8–9 mm, broadly ovate with an acute tip, often with the median nerve protruding, shortly clawed, yellow with distinct purple and brown nerves, sparsely pubescent, ciliate. Petals purple, crest of the keel purple. Capsule enclosed by persistent sepals, 4–5 ×± 4 mm, oblong, emarginate, compressed, very narrowly winged on all sides, ciliate, enclosed by the larger inner sepals. Seeds with long or short hairs, caruncle small, appendages thin and translucent, extending along side of seed almost to the base.

Flowering and fruiting: August to October.

Distribution and habitat: Southern Oman, Dhofar, on the escarpment mountains, on rocky slopes, and coastal cliffs, with *Commiphora*, *Euphorbia balsamifera*, *Blepharispermum hirtum*. *Altitude*: 100–1000 m. Distributed in tropical E and NE Africa. Elsewhere in the Arabian Peninsula found in Kuwait, Saudi Arabia, Yemen.

Distribution map & Illustration: 475.

Notes: On examination of the seed, several sheets of material from Oman identified as *P. tinctoria* are referable to *P. senensis*. The plant described and illustrated in Miller and Morris, Plants of Dhofar, p. 234–235 (1988) is also *P. senensis*. I have not seen any material of *P. tinctoria* from Oman, but I have seen authentic material from Saudi Arabia and Yemen. In facies, the two species are very similar, but apart from the seed character (caruncle appendage very short in *P. tinctoria*), the inner sepals are broadly ovate and acute in *P. senensis*, whereas they are subrotund in *P. tinctoria*.

60. Sapindaceae

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Key to the genera of Sapindaceae in Oman

1. Climbers; leaves biternate; tendrils present on the inflorescence axis; fruit obtetrahedral, inflated ..... **4. Cardiospermum**
1. Shrubs or trees; leaves simple or (1–)3-foliolate; tendrils absent; fruit not inflated

2. Petals absent; fruit capsular, 3-valved, 3-winged with broad semi-circular wings ....1. **Dodonaea**
2. Petals present; fruit 1–2-celled loculicidal capsule or drupaceous
   3. Leaves (1–)3-foliolate; petals with a hairy scale inside at the base; fruit globose, unlobed (in Oman) .....2. **Allophylus**
   3. Leaves simple; petals without a hairy scale; fruit 1(–2)-lobed .....3. **Pappea**

1. **Dodonaea** Mill.

About 60 species, widespread through tropical and subtropical regions, especially Australia.

Dodonaea viscosa (L.) Jacq., Enum. Pl. Carib. 19 (1769).
Basionym: *Ptelea viscosa* L. (1753).
Synonyms: *D. angustifolia* L.f. (1782); *D. viscosa* var. *angustifolia* (L. F.) Benth. (1863); *D. viscosa* subsp. *angustifolia* (L. F.) J.G. West (1984).
Vernacular names: shaḥs; sireṣ, shireṣ, shureṣ (Ẓufari Arabic, Jibbālī).

Description: Evergreen shrub, up to 2 m; young branches reddish brown, glabrous. Leaves alternate, 4–8 × 1–2 cm, obovate to oblong-elliptic, margin entire, apex acute or sometimes mucronate, base tapering into a very short petiole or sessile, covered with glands exuding a sticky exudate making the leaves glossy green. Flowers dioecious or monoecious (in Dhofar). Male flowers in axillary and terminal thyrses. Sepals 3(–4), free, 3–4 mm, broadly ovate; petals absent; stamens 8; ovary rudimentary. Female flowers in lax axillary thyrses; pedicels ± 10 mm, elongating in fruit; sepals and petals as in male flowers; staminodes absent or obscure; ovary 3-angled, styles 3-lobed at tip. Fruit a membranous capsule, pendant, 3-valved, 3-winged with broad semi-circular wings, pale yellow and often reddish tinged, glabrous.

Flowering and fruiting: March to May; September to October.

Distribution and habitat: Throughout Oman, including Musandam, on the Hajar mountains, often co-dominant with *Sideroxylon mascatense*, and forming one of the components of the woody vegetation there; in Dhofar found throughout the mountains, also on lower and drier slopes, and in *Commiphora-Acacia* shrubland. *Altitude*: 150–2500 m. Pantropical. Elsewhere in the Arabian Peninsula found in Saudi Arabia, UAE, Yemen.

Distribution map & Illustration: 476.

Notes: On the basis of the usually narrower leaves, Dhofar plants have been placed under a separate species (see also Miller & Morris op. cit.); I have examined material from the northern and southern mountains and note that Oman plants show a fair amount of size range in leaf so that it is difficult to separate the two taxa.

2. **Allophylus** Gled.

Distributed from tropical Africa and Arabia to South Africa, India, Sri Lanka, China through tropical Asia to Australia and Pacific, Mexico, Caribbean to Argentina.

Allophylus rubifolius (Hochst. ex A.Rich.) Engl., Abhandl. Preuss. Akad. Wiss. 1891. ii: 292 (1892).
Synonyms: *Schmidelia rubifolia* Hochst. ex A.Rich. (1847).
Vernacular names: zerben, zerkīm, zirkīn (Ẓufari Arabic, Jibbālī).

Description: Shrub or small tree, up to 5 m, dioecious; bark brown. Leaves trifoliolate, the terminal leaflet larger; leaflets (terminal) 3–8 × 2–3 cm, lateral leaflets 1–3 × 1–2 cm, ovate, margins serrate to dentate, apex acute, base cuneate or rounded, shortly tomentose becoming glabrous above, often reddish tinged; petiole 12–14 mm. Flowers small, greenish-yellow in 3–5-flowered clusters arranged in axillary racemes up to 5 cm long. Sepals 4, 1–1.5 m, the inner two larger than the outer. Petals 4, about as long as the sepals, obovate with 2 hairy scales on the inner surface. Stamens 8, filaments hairy. Style 2-lobed above. Fruit of paired or single (by abortion) drupes, ± 7 mm in diameter, subglobose, pale green.

Flowering and fruiting: July to September/ October.

Distribution and habitat: Southern Oman, Dhofar, on the wet escarpment mountains. *Altitude*: 500–1000 m. Distributed throughout tropical Africa. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen. Also found on Soqotra.

Distribution map & Illustration: 477.

Notes: The leaves have been used in traditional medicine to treat skin ulcers, wounds and boils; the fruits are edible. The flowers are an important bee forage and produce a dark honey.

3. **Pappea** Eckl. & Zeyh.
One species, distributed from Zaire to Somalia, Ethiopia and south to the Cape.

Pappea capensis Eckl. & Zeyh., Enum. Pl. Afr. Austr. 53 (1834).
Vernacular names: South African name: wild plum.

Description: Small tree, up to 5 m; bark dark grey. Leaves alternate, simple, 3–15 × 1–5 cm, oblong or obovate to oblong-lanceolate, margin sharply crenate, entire and undulate, apex shortly acuminate, base oblique, glabrous with pubescent on the nerves, pubescent beneath; petiole ± 1.5 cm. Flowers cream, monoecious, in axillary spikes. Sepals densely white-pubescent. Petals 5. Stamens with hairy filaments. Fruit 3-lobed, with usually only one of the three lobes developing, ± 1 cm in diameter, globose, pubescent, reddish brown, dehiscing along a longitudinal ridge.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, on the south eastern part of Jebel Semhan. *Altitude*: ± 300 m. Distributed in southern and eastern Africa. Known in Oman from a single location. Elsewhere in the Arabian Peninsula found in S Yemen (Hadhramout).

Distribution map: 478.

4. **Cardiospermum** L.
14 species distributed from tropical Africa and Arabia to South Africa; Texas and Florida south to Argentina and Uruguay.

Cardiospermum halicacabum L., Sp. Pl.: 266 (1753)
var. ***halicacabum***
Vernacular names: Common English name: balloon vine.

Description: Annual or perennial climber, up to 1 m, dioecious; stems ribbed. Leaves alternate, biternate with deeply lobed 3 leaflets; leaflets 15–55 × 10–20 mm, margins irregularly lobed, apex acute, sparsely pubescent to glabrous. Flowers small, white, in axillary thyrses; bracts modified into simple tendrils by which the plant climbs. Sepals 4, yellow-green, 1–3 mm,

unequal. Petals 4, 2–3 mm, each with a scale like appendage, hairy. Stamens 8, filaments pilose. Fruit 1–1.5 cm long, obtetrahedral, membranous, inflated, dehiscing into 3 segments. Seeds cordate.

Flowering and fruiting: March; October.

Distribution and habitat: Northern Oman, in the foothills and coastal plains of the northern mountains, in cultivated and irrigated fields, date orchards; weed of cultivation. *Altitude*: 10–700 m. Pantropical in distribution. Elsewhere in the Arabian Peninsula found in Saudi Arabia, ?UAE, ?Yemen.

Distribution map: 479.

61. **Burseraceae**

Bibliography

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Key to the genera of Burseraceae in Oman

Sepals and petals 5; leaves pinnate; fruit capsule-like (pseudocapsule), dry, opening into 3–5,1-seeded valves; seeds without an pseudaril . . . . . .1. **Boswellia**
Sepals and petals 4; leaves 1 or 3–5-foliolate; fruit a dehiscent drupe, fleshy, pericarp (fruit wall) splitting into 2–3 valves; seeds with a pseudaril (outgrowth) . . . . . .2. **Commiphora**

1. **Boswellia** Colebr.

20 species, distributed from Ivory Coast to India and south to NE Tanzania and N Madagascar; most numerous in tropical E Africa.

Boswellia sacra Fleuck., Lehrb. Pharmakogn. Pflanzenr.: 31 (1867).
Synonyms: *Boswellia carteri* Birdwood (1883).
Vernacular names: lubān, shajerat al luban; megherot, mughereh (Jibbālī).

Description: Tree, up to 5 m; trunk single or several from the base, bark papery, peeling; stems and branches densely tomentose; slash exuding a clear to whitish resin. Leaves alternate, clustered at the tips of branches, imparipinnate; leaflets opposite, sessile, 6–8 pairs, leaflet 15–40 × 8–20 mm, increasing in size towards the distal end, oblong, apex rounded to retuse, margin crenate-undulate, tomentose. Flowers in axillary racemes, crowded at the end of branches; racemes up to 10 cm; pedicel lengthening to 8 mm in fruit. Calyx ± 2 mm, 5-toothed above. Petals 3–4 mm, yellow-white, spreading. Stamens 10. Ovary surrounded by a fleshy disc, with the stamens inserted outside. Pseudocapsule 8–12 mm, obovoid, 3–5-angled or winged in section, opening into 3–5, 1-seeded sections.

Flowering and fruiting: September to November.

Distribution and habitat: Southern Oman (Dhofar), in the dry zone behind the monsoon affected escarpments, and on lower slopes of wadis extending to the coast. *Altitude*: 300–650 m. Distributed in N Somalia. Elsewhere in the Arabian Peninsula found in SE Yemen.

Distribution map & Illustration: 480.

Notes: This species is the source of the true frankincense that is widely used in NE Africa and Arabia as incense. The trees are tapped and the resin collected usually during the monsoon months, with collection lasting for about five months (for details on collection, harvesting and uses see Miller & Morris op. cit. & Ghazanfar in Ghazanfar & Fisher, Vegetation of the Arabian Peninsula, pp. 257–258, 1999. The Oman trees are reputed to yield the best frankincense in the world. Frankincense has long been used in Oman and Arabia for many purposes, from perfume to antiseptic and as part of several traditional medicines. It is still highly regarded by the people of Oman (and Arabia) and is used commonly in Omani homes today.

There are no plantations or small cultivations of frankincense in Dhofar, and all of the frankincense obtained comes from wild populations. The trees are heavily browsed by camels, and in several locations the trees rarely flower and set seed; several appear to be dying, dead or badly damaged and very little regeneration is observed at some locations. Careful monitoring of the tree populations and protection from grazing is recommended for the conservation of this extremely economically important species.

2. **Commiphora** Jacq.

About 150 species, distributed in the drier parts of tropical Africa, Madagascar, and from Arabia and Iran to W India; also found in Mexico and Brazil.

It is often not easy to identify species of *Commiphora* due to lack of full material as the plants are dioecious and are also deciduous; fruit and seeds are most important for the identification of species in Oman, as are the leaves.

1. Foliaceous bracteoles present 1/2 to 1/3 from the base of the pedicel . . . .1. **C. foliacea**
1. Bracteoles absent
   2. Leaves 3–5(–9)-foliolate . . . . . .4. **C. gileadensis**
   2. Leaves 1–3-foliolate
      3. Low shrub, branches prostrate and arching to the ground; leaves 10–50 × 5–40 mm, single or in fascicles; drupe 5–6 mm, aromatic when crushed . . . .3. **C. kua**
      3. Large shrub or tree, branches not as above; leaves 7–11 × 3–8 mm, usually in fascicles; drupe 5–8 cm, not aromatic when crushed . . . . . .2. **C. wightii**

1. ***Commiphora foliacea*** Sprague, Icon. Pl. 27: t. 3105 (1927).

Vernacular names: ʿaqebet, ʿaqebot, ʿaqebobeh (Jibbālī); medhīgeh, medhyīgeh (Ẓufari Arabic).

Description: Dioecious shrub, up to 1.5 m; branches sometimes intricate and spreading and with sharp tips, unarmed; bark grey-brown to grey, peeling in older stems. Leaves alternate, petiolate or in fascicles on short lateral shoots, 3-foliolate; leaflets 4–7 × 3–6 mm, the terminal leaflet largest, sessile, ovate to ovate-orbicular to ovate-spatulate to broadly ovate, apex obtuse, base cuneate to rounded, margin entire, grey-green, glabrous. Bracteoles placed half to a third from the base of the pedicel, foliaceous, 2–4 × 1 mm, suborbicular. Flowers axillary, yellow, ± 5 mm, on short lateral shoots; pedicel 18–20 mm. Male flowers: calyx 4-lobed, lobes

triangular; corolla 4-lobed, 2–4 × 1 mm, lobes narrowly oblong; stamens 8, 4 long alternating with 4 shorter; ovary absent. Female flowers: calyx and corolla 4-lobed, similar to that of the male flowers; stamens rudimentary; ovary flask-shaped, stigma capitate. Fruit (drupe) 6–12 × 5–7 mm, ellipsoid with an acute tip, red-purple when mature, 1-seeded, splitting into two halves at maturity. Seed with an orange 4-lobed pseudoaril at the base, cup-like with small lobes extending to about 1/3 of the length of the seed.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, in the drier area, in hills outside the monsoon-affected zones. *Altitude*: 150–600 m. Distributed in NE Somalia and Ethiopia. A regional endemic, elsewhere in the Arabian Peninsula found in SE Yemen.

Distribution map & Illustration: 481.

Notes: The twigs when broken give a sweet smell. The fruits are sweet and edible and the wood (dried and powdered) has been used in traditional medicine as an antiseptic for weeping and suppurating wounds. The heartwood has been used for dyeing cotton.

2. ***Commiphora wightii*** (Arnott) Bhandari, Bull. Bot. Sur. India 6: 327 (1965).
Basionym: *Balsamodendron wightii* Arnott (1839)
Synonyms: *Balsamodendron mukul* Baill. (1874-75); *Commiphora mukul* Engl. in DC. (1883).
Vernacular names: dhee (eastern Hajar area).

Description: Dioecious shrub, up to 1 m; branches prostrate and arching down to the ground; lateral shoots ending in spines; bark grey-brown, peeling in older stems. Leaves alternate, sessile, 1–3-foliolate, in fascicles of 3 to 5, arising from a short shoot; leaflets 7–11 × 3–8 mm, obovate, irregularly toothed at the apex to about the middle of the lamina, apex obtuse, base rounded to cuneate, glabrous except for a few hairs at the base of the lamina. Flowers reddish-yellow, ± 4 mm, sessile, on short lateral shoots. Male flowers: calyx 2–2.2 mm, 4-lobed above; corolla 4-lobed, lobes narrowly-oblong; stamens 8, 4 long alternating with 4 short ones. Female flowers: calyx and corolla same as the in the male flowers, 8 rudimentary stamens. Drupe 5–8 mm in diameter, subglobose, with 2 fertile locules, green when young, pinky-purple and fleshy when mature, splitting into 2 valves. Seed 1, 4-ridged, with an orange pseudaril on the ridges extending almost to the top; apical pits well developed .

Flowering and fruiting: February to early April.

Distribution and habitat: Northern Oman, on the lower slopes of the Hajar mountains with *Acacia* and *Euphorbia larica*. *Altitude*: 50–1000 m. Distributed in SW Pakistan (Baluchistan), Iran and W India. Elsewhere in the Arabian Peninsula found in ?UAE.

Distribution map & Illustration: 482.

Notes: In the eastern Hajar region of northern Oman, the gum-resin is used for chest and liver ailments, and as soap for the final bath given to the dead. *C. wightii* is commonly called Arabian myrrh or gum guggul in India, where it is recorded to be used as paste for plaster for mending bones; it is also recorded to have anti-inflammatory activities. (For the many uses of the species see SEPASAL database (Survey of economic plants for arid and semi-arid lands, Centre for Economic Botany, Royal Botanic Gardens, Kew)). *C. wightii* is also recorded from parts of Dhofar in southern Oman, but most of the specimens I have seen can be attributed to *C. kua*. There is an overlap of the two species in the eastern Hajar mountains and a few locations in the foothills of the western Hajar. The two can be distinguished (at least in Oman)

by the prostrate habit and more intricate branching in *C. wightii*, leaves in fascicles, and generally larger fruits which do not have a strong smell. Local inhabitants readily distinguish the two species, as "dhee" (*C. wightii*) and "mukul" (*C. kua*), with separate uses.

3. ***Commiphora kua*** (R.Br. ex Royle) Vollesen, Nord. J. Bot. 4(1): 37 (1984).
Basionym: *Balsamodendron kua* R.Br. ex Royle (1847).
Synonyms: *Balsamodendron habessinicum* O.Berg (1862); *Balsamodendron africanum* var. *abyssinicum* (O.Berg.) Oliv. (1868); *Commiphora habessinica* (O.Berg.) Engl. in DC. (1883), as "*C. abyssinica*"; *C. habessinica* (Berg.) Engl. var. *crenulata* A. Terr. (1893); *C. habessinica* (O. Berg.) Engl. var. *simplicifolia* Schweinf. (1899) pro parte; *C. crenulata* (A.Terr.) Chiov. (1915); *C. gowello* Sprague (1927); *C. kua* var. *gowello* (Sprague) Gillett (1991).
Vernacular names: mukul (eastern Hajar region), mrr; ʿoqor (Jibbl); meḍīgeh, medhyīgeh (Ẓufari Arabic).

Description: Dioecious shrub or small tree, up to 3 m; branches several arising from the base; lateral shoots ending in spines; bark grey, peeling in older stems, when cut exuding a pale yellow odoriferous resin. Leaves alternate, sessile, 1–3-foliolate, singly or in fascicles, on short shoots or on the main stem; leaflets 10–50 × 5–40 mm, obovate, apex obtuse, base tapering, margin irregularly serrate or irregularly toothed at the apex to about the middle of the leaf lamina, glabrous or with a few hairs at the base of the lamina. Flowers reddish, ± 4 mm, sessile on short lateral shoots. Male flowers in clusters of 4–6; calyx ± 2 mm; corolla 4-lobed, lobes 2–3 mm, narrow-oblong; stamens 8, 4 long alternating with 4 short ones. Female flowers: calyx and corolla ± same as in the male flowers; stamens 8, rudimentary. Drupe 5–6 × 5 mm, ellipsoid with an acute tip, greenish-red, pericarp splitting by 2 valves. Seed 1, with a 4-lobed orange pseudaril, the lobes extending to the top.

Flowering and fruiting: February, fruiting April-May in N Oman; September to October in Dhofar.

Distribution and habitat: Northern and southern Oman: in the north mainly in the eastern Hajar mountains, on hill slopes, with *Acacia tortilis*, *Grewia* and *Euphorbia larica*; in Dhofar on the coastal hills and coastal wadis of the escarpments and in the drier regions, mainly with *Acacia* spp. *Altitude:* 300–1500 m. Distributed in E and NE tropical Africa. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen. Also found on Soqotra.

Distribution map & Illustration: 483.

Notes: The species is similar to *C. wightii* but in Oman can be distinguished by its erect to ascending branching, aromatic resin, and bigger fruits that are aromatic when crushed. A population with large 1-foliolate leaves (up to 4 × 8 cm) is present in Wadi Aythoom on Jebel Qara, has been previously identified as *C. habessinica* or its variety, var. *simplicifolia*. Apart from a few trees there, I have not seen any other populations and I have not seen the two growing sympatrically. *C. kua* is common and widespread in Dhofar, and I feel that the larger leaved trees are a variation within this widespread taxon. *C. kua* has also been identified as *C. myrrh* and the two species do look similar, and some of the specimens that I have seen have a few glandular hairs on the calyx; but in *C. myrrh* the lobes of the pseudaril do not reach to the apex of the seed. Unless further detailed work is carried out on the *C. kua-habessinica-myrrh-wightii* group I prefer to keep the Oman material under *C. kua*.

C. kua has been used in traditional medicine for diabetes, childbirth and pus extraction; in the eastern Hajar region of northern Oman smoke from burnt stems is used for clearing homes of snakes. Ripe fruits are edible.

4. ***Commiphora gileadensis*** (L.) C.Christ., Dansk. Bot. Arkiv, 4 (9): 18 (1922).
Basionym: *Amyris gileadensis* L. (1764)
Synonyms: *Amyris opobalsamum* L. (1764); *Commiphora opobalsamum* (L.) Engl. (1883).
Vernacular names: liqām; shikof, shikuf, shqof, shuqof (Ẓufari Arabic, Jibbālī).

Description: Dioecious tree or a large shrub, up to 4 m; stems rarely spiny; bark peeling, branches and stems exuding a very odoriferous resin. Leaves alternate, or in fascicles on short lateral shoots, 3–5(–9)- foliolate; leaflets 5–40 × 3–35 mm, ovate to broadly oblong-obovate, apex obtuse to retuse, base rounded, margin sinuate, crisped pubescent, nerves prominent beneath. Flowers reddish, in few-flowered clusters on short lateral shoots; pedicel ± 1 mm. Male flowers: calyx ± 1 mm, shallowly 4-lobed; corolla ± 3 mm, 4-lobed, lobes oblong; stamens 8, equal. Female flowers: calyx and corolla same as in the male flowers; stamens rudimentary; ovary with 2 fertile locules. Drupe 6–8 × 5–6 mm, ovoid, greenish-red, with 4 white longitudinal stripes, 1-seeded, pericarp splitting into 2–4 valves. Seed with a 4-lobed pseudaril, orange, lobes wide and extending almost to the top.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, throughout the escarpment mountains, in the drier and coastal regions. *Altitude*: 100–850 m. Distributed in Djibouti, Ethiopia, Kenya, Somalia and Sudan. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map & Illustration: 484.

Notes: A species readily recognized by its pubescent pinnate leaves and the pleasant smell given when a twig is broken or a leaf is crushed. The inner wood (dried and powdered) has been used in traditional medicine for wounds, skin irritations, bites and for post-partum cleansing and purification; dye obtained from the bark has been used as a dye for cloth; the ripe fruit is edible.

62. Anacardiaceae

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Key to the genera of Anacardiaceae in Oman

1. Inflorescence and young leaves with stellate hairs; flowers 4-merous . . . . . .1. **Lannea**
1. Inflorescence and leaves with simple hairs; flowers 5-merous
   2. Leaves 3-foliolate . . . . . .2. **Rhus**
   2. Leaves with 5 or more leaflets . . . . . .3. **Pistacia**

2. **Rhus** L.

About 200 species distributed in the tropical and warm temperate regions.

1. Leaflets 3–17 cm long, margins entire
   2. Leaflets ovate to ovate-elliptic, the terminal leaflet largest, densely pubescent beneath, never sticky ..... 1. **R. somalensis**
   2. Leaflets elliptic-oblong, the terminal leaflet only slightly larger than the laterals, glabrous and sticky ..... 2. **R. retinorrhaea**
1. Leaflets 0.7– 1.8 cm long, margins shallowly or deeply lobed or entire
   3. Prostrate shrubs; leaflets entire, apex of the terminal leaflet sometimes shallowly 3-lobed ..... 4. **R. gallagheri**
   3. Small trees, shrubs, or scrambling shrubs, never prostrate; leaflets lobed, lobation irregular, the terminal leaflet usually 3-lobed, with each lobe further 3-lobed at the apex, lateral leaflets 3-lobed at the apex ..... 3. **R. aucheri**

1. ***Rhus somalensis*** Engl., Abh. Preuss. Akad. Wiss. Math-Naturwiss, Kl. 1891: 289 (1892). *Vernacular names*: ḍirfit (Ẓufari Arabic), zerfit (Jibbālī).

Description: Dioecious shrub or small tree, up to 10 m; bark grey-white, minutely pubescent in young stems. Leaves alternate, 3-foliolate, petiole 2.5–4 cm, densely pubescent; leaflets sessile, 5–13(–15) × 2–5.5(–8) cm, oblong-obovate to elliptic-oblong, the terminal leaflet largest, apex obtuse, base cuneate, unequal, margin entire, undulate, leaflets green above and glabrous, yellowish-green beneath and densely covered with appressed hairs. Bracts lanceolate. Flowers ± 2 mm across, in axillary and terminal thyrsoid panicles up to 13 cm long; pedicel 3–4 mm, pubescent. Calyx 5-lobed, lobes ± 1 mm, glabrous. Petals 1.5–2 mm, oblong-ovate, pale yellow to cream. Disk basal to ovary, flat, shallowly 10-lobed at the margins. Male flowers: stamens 5, exserted from the corolla. Female flowers with 5 rudimentary stamens; ovary globose, 1-celled; drupe, subglobose, 5–6 mm in diameter, 1-seeded, greenish-red at maturity, glabrous.

Flowering and fruiting: August to October.

Distribution and habitat: Southern Oman, Dhofar, on the escarpment mountains, in *Anogeissus* woodland. *Altitude*: 150–800 m. Distributed in Somalia. Elsewhere in the Arabian Peninsula found in SE Yemen.

Distribution map & Illustration: 485.

2. ***Rhus retinorrhaea*** Steud. ex A.Rich., Tent. Fl. Abyss. 1: 142 (1847).

Description: Dioecious shrub or small tree, up to 2 m; bark brown, glabrous. Leaves alternate, 3-foliolate, petiole 1–2 cm, glabrous; leaflets sessile, 15–35 × 5–10 mm, elliptic-oblong, the terminal leaflet largest, apex obtuse, base cuneate, ± unequal, margin entire, glabrous, sticky. Bracts minute, lanceolate. Flowers ± 1 mm across, in axillary and terminal thyrsoid panicles up to 7 cm long; pedicel ± 1 mm. Female flowers: calyx 5-lobed, lobes ± 0.5 mm, glabrous; petals ± 1 mm, cream; ovary globose, 1-celled; drupe subglobose, 2–3 mm in diameter, 1-seeded, reddish at maturity, glabrous. (Male flowers not seen).

Flowering and fruiting: September.

Distribution and habitat: Southern Oman, Dhofar, on Jebel Semhan, on the relatively drier, eastern coastal escarpment. *Altitude*: ± 1600 m. Distributed in SW Arabia (Yemen).

Distribution map: 486.

Notes: The specimen from Dhofar, Jebel Semhan (on which the above description is based) shows much smaller leaves than any other material that I have examined (up to 12 × 3 cm in

the typical material from Yemen) but the flowers and fruits are more or less the same size. It is probably an extreme variant from the dry, exposed dissected limestone plateau on Jebel Samhan where the effect of the monsoons is much reduced. Unfortunately this is the only collection from Oman, but it would seem unreasonable to give it a separate rank without more material, even though none has been collected so far east.

3. ***Rhus aucheri*** Boiss., Diagn. Pl. Or. ser.1 2: 5 (1843).
Type: Oman, reg. Mascat, *Aucher-Eloy* 4324 (syntype K, G, P).
Vernacular names: qataf.

Description: Dioecious, scrambling shrub to a small tree, up to 3 m, often forming large clumps, bark brown with a whitish bloom, glabrescent. Leaves alternate, 3-foliolate; petiole 10–15 mm, somewhat winged, pubescent; leaflets sessile, 10–20 × 7–10 mm, obovate in outline, deeply to shallowly 3-lobed in the upper part, apex of lobes obtuse, base long cuneate, margin entire, grey-green, densely white-pubescent. Bracts minute, triangular, white-pubescent. Flowers ± 1 mm across, in axillary and terminal thyrsoid panicles up to 5 cm long; pedicel ± 1 mm, pubescent. Calyx 5-lobed, lobes ± 0.5 mm, pubescent. Petals ± 1 mm, oblong-ovate, cream. Male flowers: stamens 5, about the same length as the corolla. Female flowers with 5 rudimentary stamens; ovary globose, 1-celled; drupe subglobose, 3–4 mm in diameter, 1-seeded, red and glossy at maturity, glabrous.

Flowering and fruiting: September to March.

Distribution and habitat: Northern Oman, in the foothills and lower slopes of the eastern and western Hajar mountains; common in wadis, shallow gorges, hill slopes, and coastal wadis, with *Acacia tortilis*. *Altitude*: 20–600 m. Endemic to northern Oman; expected to occur in the hills in UAE.

Distribution map & Illustration: 487.

Notes: The flowers produce abundant pollen, which is collected by bees.

4. ***Rhus gallagheri*** Ghaz., Kew Bull. 57: 491–494 (2002).
Type: Oman, Dhofar, hills above Sharbitat, 190 m, 24 December 1986, *MP Hughes & MD Gallagher* 7895/2 (holotype K, isotypes E, ON).

Description: Dioecious shrub, 0.5–1 m, stems and branches ± prostrate, spreading, up to 3 m across; bark in older stems grey-white, in younger stems and new shoots red-brown, young branches covered with white appressed hairs, and some spreading hairs. Leaves alternate, 3-foliolate, densely appressed-hairy, interspersed with simple brown hairs and glandular hairs, petiole 7–10 mm; leaflets sessile, 10–27 × 5–17 mm, obovate, margins entire, apex rounded to shallowly 3-lobed at the apex, base cuneate to attenuate, green above, pale green beneath, appressed pubescent on both surfaces. Flowers ± 2 mm across, in axillary and terminal thyrsoid panicles up to 4 cm long. Bracts 0.5–1 mm, lanceolate; pedicel 4–6 mm, pubescent. Calyx 5-lobed, lobes 0.75–1.0 mm, triangular, appressed pubescent. Petals 1.5–2 mm, oblong-ovate, pale yellow to cream. Disk basal to ovary, ± 2 mm across, flat, shallowly 10-lobed at the margins. Male flowers: stamens 5, exserted from the corolla. Female flowers marginally bigger than the male flowers, with 5 rudimentary stamens; ovary globose, 1-celled; drupe, subglobose, 5–6 mm in diameter, cherry-red at maturity, glabrous.

Flowering and fruiting: September to November.

Distribution and habitat: Southern Oman, Dhofar, on the limestone plateau and hills in eastern Dhofar, in stony wadis and depressions; also found on Jebel Qamar, with *Commiphora* and *Euphorbia balsamifera*. *Altitude*: 130–150(–1000) m. Endemic to Dhofar.

Distribution map: 488.

Notes: The species is rarely found in the drier parts of its distribution. The collection from Jebel Qamar is a small shrub to 1 m and is found at ± 1000 m. In eastern Dhofar, the species is readily recognized by its pale green foliage and prostrate habit, often growing up into other shrubs and grass tussocks, and occasionally attaining 0.5 m.

2. **Lannea** A. Rich. (nomen conserv.)
Odina Roxb.

About 40 species distributed from Senegal to Somalia and Arabia and south to South Africa; India and Sri Lanka, S China and Indo-China.

Leaves 5–7-foliolate; fruit glabrous ..... 1. **L. malifolia**
Fruit densely stellate-hairy ..... 2. L. cf. **triphylla**

1. ***Lannea malifolia*** (Chiov.) Sacl. (1934).
Basionym: *Odina malifolia* Chiov. (1929).
Vernacular names: for *Lannea* spp.: enbor, eynur, ghasor, ghasār, joro' (Jibbālī).

Description: Dioecious, shrub or small tree, up to 3 m; bark grey, smooth. Leaves alternate, 3–5(–7)-foliolate; petiole 20–25 mm, stellate-pubescent; leaflets sessile, 15–30 × 14–28 mm, broadly ovate to obovate, apex obtuse to obscurely retuse, base shortly cuneate to truncate, margin entire, grey-green, densely white stellate-pubescent. Inflorescence in terminal spikes. Sepals 4, ± 1.2 mm, ovate, glandular. Petals ± 2 mm, oblong-ovate, greenish-yellow. Stamens 8. Ovary with 4 small styles, (flowers not seen, description from illustration in Miller & Morris, 1988: p. 27). Drupe ovoid, ± 8 × 5 mm, with prominent style basis at the apex, reddish-green, glabrous.

Flowering and fruiting: September; producing fruit at the end of the summer season.

Distribution and habitat: Southern Oman, Dhofar, on the escarpment, in wadis and river-beds, and near water-holes, in woodland with *Commiphora*, *Croton confertus*. *Altitude*: ± 450 m. Distributed in NE Kenya (rare), Somalia and Ethiopia. Elsewhere in the Arabian Peninsula found in Saudi Arabia, ?Yemen.

Distribution map & Illustration: 489.

Notes: The species is not common; I have seen only a single collection from Dhofar. The illustration in Miller & Morris (1988: p. 27) is that of *L. malifolia*. In Ethiopia and Somalia, the leaves of *L. malifolia* are 1–7-foliolate; some plants from NE Somalia are very similar to our plants with 3–5 leaflets. I have not seen any material of *L. triphylla* from Oman, but it is reported from the Al Mahra in the Hauf mountains in SE Yemen and is likely to be present in Oman. The fruits are edible.

3. **Pistacia** L.

9 species, distributed from the Mediterranean region east to Himalaya, China and Taiwan, south in Africa to Tanzania, in Asia to Malaysia and Philippines. Also distributed in Texas and Mexico.

Pistacia falcata Beccari ex Martelli, Fl. Bogosensis 25 (1886).
Vernacular names: selat (Jibbālī).

Description: Dioecious, deciduous tree, up to 5 m tall. Leaves alternate, imparipinnate, leaflets 5–9 pairs, 1.5–10× 1.0–1.5 cm, narrow-ovate, apex acute, base oblique, margin entire, reddish on the nerves. Flowers unisexual, in axillary panicles; bracts and bracteoles surrounding the inflorescence, membranous, 1–1.5 mm, linear to linear-ovate. Calyx and corolla absent. Male flowers in dense panicles; stamens 4–5, inserted on a disk. Female flowers in lax panicles, ovary 1-celled, styles 3. Fruit a drupe, 7 × 6 cm, ovoid and laterally compressed, with a small beak at the apex, 1-seeded, red at maturity, glabrous.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, on the drier areas of the escarpment mountains. *Altitude*: Distributed from Ethiopia to Somalia and SW Arabia. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map & Illustration: 490.

Notes: An African species whose northernmost location reaches Dhofar, where it is rare. It has been categorized on the National Red List as Least Concern, but may be Near Threatened due to threat to its habitat from rapid development in the escarpment mountains through road and house building and expansion of mountain villages; also at threat from grazing pressure, especially near water-holes. The roots of the plant have been used traditionally as protection against the 'evil eye'.

Cultivated species
Mangifera indica L. (1753).
Vernacular names: amba.
The mango is occasionally cultivated in homes in Oman. It flowers in the winter months and fruits appear in the summer.

63. **Rutaceae** (by A. Patzelt)

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Key to the genera of Rutaceae in Oman

1. Leaves simple or 2–3-lobed; flowers 5-merous ..... 1. **Haplophyllum**
1. Leaves 2- or 3-pinnatisect; flower mostly 4-merous
   2. Petals ciliate fringed, yellow ..... 2. **Ruta**
   2. Petals entire, purple-pink ..... 3. **Thamnosma**

1. **Haplophyllum** A. Juss. (nomen. conserv.)
About 67 species distributed from the Mediterranean region east to Siberia, Mongolia, W China and W Himalaya south to Sudan and Somalia.

Haplophyllum tuberculatum (Forssk.) A.Juss., Mém. Mus. Hist. Nat. 12: 528 (1825 "Aplophyllum"); Boiss., Fl. Or. 1: 939 (1867).
Basionym: Ruta tuberculata Forssk. (1775).
Vernacular name: tafar at tays, tayes, tifr at teys; e teys, ḥerum ēqeroṣ (Jibbālī); laḥyet, shajaret al ba'ūḍ (Ẓufari Arabic).

Description: Erect or ascending perennial herb, up to 60 cm, often with a woody base, smelling unpleasant when crushed; whole plant covered in numerous wart-like glands, crisped-hairy at least at the base; stems branched from the base, yellowish-green. Leaves alternate, variable in form and size, 5–10(–40) × 3–6(–10) mm, entire or 2–3-lobed, elliptic to obovate or linear, apex acute or obtuse, base attenuate, margin entire or crenate, often involute, glabrous or sparsely lanate. Flowers in lax corymbose terminal panicles. Sepals 5, free, 0.75–1.25 mm, broadly ovate, glabrous to ciliate or pubescent. Petals 5, bright yellow, free, 3–4(–5.5) mm, ovate to oblong. Stamens 10, filaments expanded at base and pubescent below. Ovary 5-lobed, densely glandular; style simple, stigma globose. Fruit (capsule) 1.5–2 × 2.5–4 mm, depressed-globose, deeply 5-lobed, covered with tuberculate or punctuate glands. Seeds reniform, black to grey, transversally rugose.

Flowering and fruiting: February to April in northern Oman; September to November in southern Oman.

Distribution and habitat: Throughout Oman in open, gravely, sandy and stony areas, dried-up watercourses, cultivated or fallow fields, waste and disturbed ground. *Altitude*: 20–1500 m. Distributed from N and E Africa to the Middle East and eastward to Pakistan. Elsewhere in the Arabian Peninsula found in Bahrain, Kuwait, Qatar, Saudi Arabia, UAE, Yemen.

Distribution map & Illustration: 491.

Notes: A widespread rather than a generally abundant species. Unpalatable to livestock, its presence is often an indication of overgrazing. The whole plant has been used in traditional medicine and as an insecticide.

2. **Ruta** L.
7 species, found from Macaronesia and the Mediterranean region to southwest Asia.

Ruta chalepensis L., Mant. i: 69 (1767).
Vernacular names: khiḍf, sidāb.

Description: Perennial herb up to 60 cm; stems erect, often woody at base, densely foliose, strongly aromatic. Leaves alternate, 2- or 3-pinnatisect, petiolate or sessile above, 2–10 cm long, oblong in outline, ultimate segments narrowly oblong-lanceolate or ovate. Flowers in lax terminal corymbs; pedicels equalling or exceeding the capsules; bracts glabrous, very broad, the lowest cordate-ovate, much wider than the subtended branch. Sepals 4, glabrous, deltoid-ovate. Petals 4, oblong, yellow, with a ciliate margin. Fruit (capsule) 7–8 mm, glabrous, divided about halfway into 4(–5) acute lobes.

Flowering and fruiting: February to May, the fruits persisting on the plants for several months.

Distribution and habitat: Northern Oman, occurring as a ruderal in plantations in the Jebel Akhdar range. *Altitude*: 1500–1900 m. Distributed from the Mediterranean region to Pakistan, Somalia and Ethiopia, cultivated elsewhere. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen. Also found on Soqotra.

Distribution map & Illustration: 492.

Notes: Not native to Oman, and either found as an escape or weedy in cultivated land. It is recorded only from a few locations in northern Oman from near mountain villages. The plant has been used in traditional medicine to cure rheumatism, colic, snakebites, headache and wounds.

3. **Thamnosma** Torr. & Frém.
11 species with a markedly discontinuous distribution: 3 species in southern Africa, 3 in the Horn of Africa region and Arabia, and 5 in central Mexico and the southern part of USA.

Thamnosma hirschii Schweinf., Kew Bull. 1895: 315 (1895).
Synonyms: Rutosma hirschii Schweinf. (1847).
Vernacular names: na'na', na'na ērūn (Jibbālī).

Description: Annual or perennial herb, up to 30 cm, whole plant pleasantly aromatic; stems branching from the base, ascending, glabrous, covered with minute pale yellow glands immersed in the surface tissue. Leaves alternate, grey-green, often purple-tinged, 10–25 × 1–3 mm, linear-elliptic to linear-obovate, glabrous, minutely glandular, apex acute to obtuse, base attenuate, margin entire to minutely crenate-serrate. Flowers in lax, few-flowered, terminal cymes; pedicels 1–2 mm in flower, elongating to 6 mm in fruit. Sepals 4, shortly connate at base, 0.5–0.75 mm, broadly ovate. Petals 4, purplish-pink, ± 3 mm, broadly ovate to broadly obovate. Stamens 8, almost as long as petals. Ovary 2-lobed, densely glandular, 2-locular; style simple. Fruit (capsule) 5–6 × 3.5–5 mm, densely glandular, green-tinged purple at first, becoming whitish, lobed half-way with narrow sinus, many-seeded. Seeds reniform to round, tuberculate, brown.

Flowering and fruiting: August to September.

Distribution and habitat: Southern Oman, Dhofar, in the drier plains, open grasslands and dry shrubland. *Altitude*: 10–20 m. Distributed from Somalia to Southern Arabia. Elsewhere in the Arabian Peninsula found in Yemen. Also found on Soqotra.

Distribution map & Illustration: 493.

Notes: The distribution of the species is near or around airstrips in Dhofar, as it is on Soqotra.
The name of this species is based on a specimen collected from the Hadhramaut, Yemen by Schweinfurth, Hirsch 77 (K)

Cultivated species

Citrus aurantifolia (Christm.) Swingle (1913).
Vernacular names: laymun, limoon, lmi, lyt, shajarat al lmah. Common English name: lime.
A small much-branched tree, up to 5 m tall with short sharp spines and white flowers. Fruit 3.5–6 cm in diameter, globose to subglobose, often with apical papilla and a very acid pulp. Widely cultivated in northern and southern Oman. Often dried on rooftops in many mountain villages and used in traditional cuisine; juice is used for making lime drinks and flavouring dishes.

Citrus latifolia Tanaka (1951).
Common English name: Tahiti lime
Tree up to 6 m with nearly unarmed drooping branches and purplish young shoots. Flowers purple-tinged. Fruit 4–6 cm in diameter, oval, obovate, oblong or short-elliptical, usually rounded at the base, apex rounded with a small nipple; peel pale yellow, smooth, thin, tightly clinging, with acid pulp, usually seedless. A new introduction to replace *C. aurantifolia* (Lime) due to the widespread occurrence of Witches' Broom disease on Omani lime trees.

Citrus limettioides Tanaka (1937).
Vernacular names: safargal, safarjal; Common English name: sweet lime
Small tree up to 6 m with almost unarmed branches. Leaves with serrated margins and nearly wingless petioles. Fruit oval, obovate or oblong, usually rounded at the base with a smooth peel, pale orange-yellow when ripe and sweet pulp. Widely cultivated in some areas of northern Oman and highly revered for its sweet taste and as a health tonic.

Citrus limon (L.) Burm.f. (1768).
Vernacular names: leymon adhalia; Common English name: lemon.
Small tree, up to 6 m tall, with stout stiff thorns. Fruit 5–10 cm long, oval with terminal nipple, and a thick pale yellow peel and acid pulp. Cultivated for making pickles, but not commonly so.

64. **Oxalidaceae** (by A. Patzelt)

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Oxalis L. (1753).
A cosmopolitan genus with about 800 species, found mainly in South-Central America and South Africa.

Oxalis corniculata L., Sp. Pl.: 435 (1753).
Vernacular name: ḥamiḍ.

Description: Annual or perennial herb up to 30 cm. Stems numerous, hairy, procumbent or ascending, often rooting at nodes. Leaves alternate, petiolate, stipulate, 1–4(–6) cm long, ciliate or rarely glabrous, delicately 3-foliolate; leaflets sessile, 0.5–1 cm long, obcordate with a narrow sinus about one-third of way down, usually broader than long, ± hairy at margins and on lower surface; stipules 1.5-2 mm long; petioles exceeding the blade. Bracts 2-many, 2–4 mm, linear-lanceolate. Flowers solitary or in small umbels, arising from leaf axils; peduncles equalling or exceeding the leaves. Sepals 2–5 mm, ovate-lanceolate, hairy. Petals 4–10 mm, yellow, shallowly emarginate, cuneate. Styles hairy, about as long as the long filaments. Fruit (capsule) 1–2.5 × ± 0.3 cm, linear-oblong, on reflexed pedicel shorter than or equalling the fruit, puberulent. Seeds 1-many per locule, 1–1.5 mm, ovoid, flattened, transversely wrinkled, brown.

Flowering and fruiting: March to May.

Distribution and habitat: Throughout Oman, in cultivated and waste ground, in damp shaded places; an introduced weed common in cultivated land and by roadsides. *Altitude*: 10–2300 m. Widespread in most warm tropical and temperate countries. Elsewhere in the Arabian Peninsula found in Qatar, Saudi Arabia, UAE, Yemen.

Distribution map & Illustration: 494.

Notes: A polymorphic species, variable in size and pubescence characters. Forms with purplish leaves are found commonly.

65. Zygophyllaceae

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I have followed Beier et al. (2003) for the treatment of *Zygophyllum* s.l.: *Z. album*, *Z. decumbens*, *Z. hamiensis*, *Z. qatarensis*, *Z. simplex* are now included in *Tetraena* Maxim., and *Z. robecchhii* in *Melocarpum* (Engl.) Beier & Thulin. *Fagonia* was shown to be closely related to *Melocarpum* (Beier et al. 2004).

Key to the genera of Zygophyllaceae in Oman

1. Leaves paripinnate; fruit splitting into 5 indehiscent mericarps
   2. Leaves opposite, often anisophyllous; mericarps with spines or wings . . .2. **Tribulus**
   2. Leaves alternate, strongly anisophyllous; mericarps without spines but sometimes with small horns . . . . . .3. **Kelleronia**
1. Leaves 1–3-foliolate; fruit drupaceous, capsular or schizocarpic
   3. Trees; fruit a fleshy drupe . . . . . .1. **Balanites**
   3. Shrubs and herbs, never trees; fruit schizocaric or capsular
      4. Petals present; stamens 8–10; fruit uniform in colour, without green bands
         5. Filaments with basal appendages; outer testa with internal rod- funnel-shaped structures; fruit schizocarpic . . . . . .6. **Tetraena**
         5. Filaments without basal appendages; outer testa without internal rod- or funnel shaped structures . . . . . .
            6. Stipules free, spinescent or pointed; fruit pubescent . . . . . .4. **Fagonia**

6. Stipules fused; fruit glabrous .....5. **Melocarpum**
4. Petals absent; stamens 5; fruit with longitudinal green bands .....7. **Seetzenia**

1. **Balanites** Delile

9 species, 2 in India and Burma and others distributed throughout Africa, of which 2 also found in Arabia.

Balanites aegyptiaca (L.) Delile, Descr. Egypte Hist. Nat.: 221 & t. 28, 1 (1813).
Basionym: *Ximenia aegyptiaca* L. (1753).

Description: Tree, semi-deciduous, up to 10 m; branches somewhat pendulous, with rigid spines reaching up to 8 cm; bark greyish-brown. Leaflets sessile, 8–60 × 3–50 mm, obovate to rounded-ovate, base shortly cuneate, apex acute to obtuse, margin entire. Flowers in fascicles on nodes. Sepals 4–5 mm, spreading. Petals 5–7 mm, ovate to ovate-oblong, yellow-green. Stamens 10. Ovary pubescent. Drupe 2.5–4 cm long, ellipsoid, pubescent when young, greenish-yellow when mature, edible, flesh fibrous and oily, 1-seeded.

Flowering and fruiting: ?March/April.

Distribution and habitat: Northern Oman, on the coastal hills of the eastern Hajar.
Altitude: ± 50 m. Distributed in Africa. Elsewhere in the Arabian Peninsula found in Yemen.

Distribution map & Illustration: 495.

Notes: Only three trees have been recorded from a single locality in northestern Oman. Whether the species is native there or introduced is debatable. Several species show a similar distribution to this one, being present in NE Oman (eastern Hajar mountains or foothills) and NE Africa, but not in SE Oman (Dhofar). I have not seen any fruiting material from Oman.

2. **Tribulus** L.

25 species distributed in tropical and warm regions, especially Arabia and drier regions of Africa.

Species of *Tribulus* in Oman (and wider Arabia) show a large amount of variation in leaf characters and in the size, pubescence and the spine or wing characters of mericarps. I have looked at most of Arabian and NE African material and type material, and note that, at least in Oman, several of the described species and infraspecific taxa do not hold good. In the plants with winged carpels (Sect. *Alata* Hadidi) two distinct groups can be recognized: one with usually small flowers and mostly 5 stamens, and the other with larger flowers and 10 stamens. Much intermediate material is present, with variations especially in the shape and size of wings of carpels, which has been identified in various specific and subspecific ranks. Unless cytological and molecular studies are carried out, it is not possible to recognize specific or subspecific taxa (see also Mandaville, 1988).

1. Fruit (mericarps) with spines
2. Mericarp with pairs of spines on the dorsal surface the median pair longer than the lower pair .....1. **T. terrestris**
2. Mericarp without spines or with two small spines on the dorsal surface .....2. **T. bimucronatus**
1. Fruit (mericarps) with wings
3. Branches prostrate; smaller leaf 1.5–2 cm; pedicel 6–8 mm; exposed gravel and sandy ground .....3. **T. pentrandus**

3. Branches erect; smaller leaf ± 1 cm; pedicel 15–20 mm; exposed sand dunes and ground ..... **4. T. arabicus**

1. ***Tribulus terrestris*** L., Sp. Pl.: 387 (1753).
Synonyms: *Tribulus terrestris* var. *robusta* (Boiss. & Noe) Boiss. (1867); *T. terrestris* var. *orientalis* (A. Kern.) Beck (1892); *T. terrestris* var. *parvispinus* (C.Presl) F.Al-Hemaid & Jacob Thomas (1996).
Vernacular names: akhulla, ghaţeb (Harsūsī), qaţab, 'umm gerayn.

Description: Annual herb, often with a woody stock, and yellow-green, prostrate branches up to 50 cm, ± pubescent, hispid or villous. Leaves paripinnate, often anisophyllous, the larger 2–3 cm, smaller 0.7–1.5 cm; petiole 5–6 mm; leaflets 4–5 ×2–2.5 mm, lanceolate to elliptic, base unequal, acute, pubescent to villous, grey-green; stipules linear. Flowers solitary in the axil of the smaller leaf; pedicel 4–10 mm. Sepals 3–6 mm, linear, deciduous. Petals yellow, 4–8 mm, obovate. Stamens 8–10, in 2 whorls. Fruit with mericarps 4–5 mm long and broad, pubescent to villous, tuberculate and with 2 pairs of spines on the dorsal surface; tubercles sometimes prominent, rounded or pointed at apex, sometimes appearing as spines; spines with the median pair longer than the lower pair, (2–)4(–5) mm, stout or weak.

Flowering and fruiting: February to April; September to October.

Distribution and habitat: Throughout Oman, in stony, pebbly and sandy ground, in open and waste places, gardens, cultivations, often weedy. *Altitude*: 10–700 m. Distributed in the Mediterranean, Aegean, N Africa and tropical and S Africa, Arabia eastwards to China, Japan and Australia; introduced in N, C and S America. Elsewhere in the Arabian Peninsula found in ?Bahrain, Kuwait, Qatar, Saudi Arabia, UAE, Yemen. Also found on Soqotra.

Distribution map & Illustration: 496.

Notes: A very widespread and variable species. I have included under this species the Oman material identified as *T. parvispinus* Presl. and *T. parvispinus* var. *intermedius* (Kralik) Hosni, as I have not seen any material from Oman that I can fully identify as *T. parvispinus*; I have also included material identified as *T. echinops* Kers. and *T. rajasthanensis* Bhandari & Sharma as these appear to be variants of *T. terrestris* with more than 2 pairs of weak spines on the mericarps.

2. ***Tribulus bimucronatus*** Viv., Pl. Aegypt. Dec. 4: 9 (1830).
Synonyms: *Tribulus inermis* Kralik (1849); *T. bimucronatus* Viv. var. *inermis* (Kralik) H.A.Hosni (1985).
Vernacular names: qaţab, quţab (also in Harsūsī).

Description: Annual herb, often with a woody stock, and yellow-green, prostrate branches up to 30 cm, white-pubescent to villous. Leaves paripinnate, often anisophyllous, the larger ± 3 cm, smaller ± 2 cm, petiole 5–7 mm; leaflets 4–6 × 2–3 mm, lanceolate to elliptic, base unequal, acute, pubescent to villous, grey-green; stipules linear. Flowers solitary in the axil of the smaller leaf; pedicel 4–5 mm. Sepals 4–5 mm, linear, deciduous. Petals yellow, about twice the length of the sepals, obovate. Stamens ?10. Fruit pyriform, with mericarps 5–6 mm long and broad, pubescent to villous, tuberculate, without spines or with 2 small spines on the dorsal surface; tubercles sometimes prominent, rounded or pointed at apex.

Flowering and fruiting: February to April; September to October.

Distribution and habitat: Throughout Oman, in stony, pebbly and sandy ground, gravel wadi beds, in open places. *Altitude*: 10–700 m. Distributed in N Kenya, N Ethiopia, Somalia and SW Arabia. Elsewhere in the Arabian Peninsula found in Kuwait, Saudi Arabia, ?UAE, Yemen.

Distribution map: 497.

Notes: This species is sometimes difficult to distinguish from *T. terrestris*, as the difference seems mainly in the lack of spines on the mericarps. There is some material from northern Oman which falls under the typical species, but there are also several sheets which are intermediate between this and *T. terrestris*, showing weak to strong spines. More material is needed to fully assess the taxonomic status of this species in Oman.

3. ***Tribulus pentandrus*** Forssk., Fl. Aegypt.-Arab.: 88 (1775).
Synonyms: *Tribulus alatus* Del. (1813), nom. nud.; *T. longipetalus* Viv. (1830).
Vernacular names: quṭab, quṭaba.

Description: Annual, with a woody stock and grey-green prostrate branches up to 40 cm, densely white-pubescent. Leaves paripinnate, anisophyllous, the larger 3–3.5 cm (including petiole), smaller 1.5–2 cm; petiole 3–6 mm; leaflets 4–8 ×3–4 mm, lanceolate to elliptic, base unequal, apex acute, villous, grey-green; stipules linear. Flowers solitary in the axil of the smaller leaf; pedicel 6–8 mm. Sepals 4.5–5 mm, linear, deciduous. Petals pale yellow, ± twice the length of the sepals. Fruit with mericarps 7–8 mm long, pubescent, dorsal surface somewhat pitted and provided with a pair of wings; wing ± 2 mm wide, more or less of the same width all over, or often somewhat jagged at the edges or edges sinuate.

Flowering and fruiting: February to April; September.

Distribution and habitat: Throughout Oman, in exposed stony, gravelly and sandy ground; more abundant in the central desert. *Altitude*: 10–500 m. Distributed in Somalia. Elsewhere in the Arabian Peninsula found in Kuwait, Saudi Arabia, UAE, Yemen.

Distribution map: 498.

Notes: Under this taxon, I have included all material from Oman identified as *T. macropterus* Boiss. (1843), *T. megistropteris* Kralik (1849) and *T. pterocarpus* Ehrenb. ex C. Muell. (1857) and infraspecific categories of these taxa.

The whole plant is used in traditional medicine as a diuretic.

4. ***Tribulus arabicus*** Hosni, Bot. Not. 130: 261 (1977).
Type: Oman, W of Jebel Samhan, Thesiger s.n. (holotype BM, isotype CAI) [Type of *T. omanensis* Hosni]
Synonyms: *Tribulus omanensis* Hosni (1978); Type as above.
Vernacular names: zahara, zahra.

Description: Perennial, with a woody stock and yellow-grey-green branches; branches erect to ascending, up to 40 cm, white-pubescent. Leaves paripinnate, markedly anisophyllous, the larger 1.5–2 cm (including petiole), smaller ± 1 cm; petiole 3–5mm; leaflets 4–6 × 1–2 mm, lanceolate to elliptic, base unequal, apex acute, villous, grey-green; stipules linear. Flowers bright yellow, solitary in the axil of the smaller leaf; pedicel 15–20 mm. Sepals 5–5.5 mm, linear, deciduous. Petals 9–10(–12 mm). Stamens 8–10, in 2 whorls. Fruit with mericarps ± 7 mm long, pubescent, dorsal surface somewhat pitted and provided with short wings.

Flowering and fruiting: February to April.

Distribution and habitat: Southern Oman, Dhofar, in the dry exposed sandy areas, on sand dunes, in sandy and saline soil. *Altitude*: ± 150 m. Endemic to the Arabian Peninsula; elsewhere found in Qatar, Saudi Arabia, ?UAE, Yemen.

Distribution map & Illustration: 499.

Notes: This is a very distinct species with large, showy yellow flowers found in the south-western sandy deserts of Oman. The smaller leaves are quite small so that without a closer look, the plant sometimes appears to have alternate leaves. Grazed by livestock.

3. **Kelleronia** Schinz.
10 species, distributed in SW Arabia, Ethiopia and Somalia.

Kelleronia gillettae Baker. f., Jour. Bot. 1898: 6 (1898) as "gillettii".
Synonyms: *Tribulus gillettiae* (Baker f.) Chiov. (1929).

Description: Small, low shrub, up to 1.5 m; branches erect to procumbent, pubescent; older stems with a rough bark. Leaves paripinnate, strongly anisophyllous; petiole 8–10 mm, pubescent; leaflets 8–15 × 10–12 mm, broadly oblong to rotund, base unequal, apex rounded with a small mucro, pubescent. Flowers solitary in the axils of smaller leaves, up to 2 cm across, yellow; pedicel ± 15 mm, elongating to 2.5 cm in fruit. Sepals 10–12 mm, lanceolate. Petals 2.4–2.5 cm, obovate. Fruit 10–11 × ± 20 mm, strongly angled, with a persistent style, reticulate on the dorsal surface, ± glabrous, pubescent in between the mericarps.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, stony round and low coastal hills; not common. *Altitude*: 100–600 m. Distributed in Ethiopia and Somalia. Elsewhere in the Arabian Peninsula found in Yemen.

Distribution map & Illustration: 500.

Notes: A spectacular plant in flower, not common in Dhofar.

4. **Fagonia** L.
About 35 species distributed in the dry regions from India to Kenya, Botswana, Namibia and South Africa; California, Arizona; N Chile; absent in Australia.

1. Leaves 3-foliolate (sometimes the upper ones 1-foliolate)
   2. Leaflets more or less 3-foliolate throughout, 5–15 mm long, petiolate . . . . . .2. **F. schweinfurthii**
   2. Leaflets 3-foliolate in the lower part, often 1-foliolate in the upper; leaflets 3–5 mm, ± sessile . . . . . .1. **F. bruguieri**
1. Leaves 1-foliolate
   3. Stipules distinctly spinescent
      4. Leaflets narrow elliptic, 0.5–2 mm wide . . . . . .3. **F. indica**
      4. Leaflets elliptic, 3–8(–13) mm wide . . . . . .4. **F. ovalifolia**
   3. Stipules or stipular spines small (± 1 mm) or absent
      5. Leaflets rotund . . . . . .5. **F. luntii**
      5. Leaflets linear to lanceolate . . . . . .6. **F. mahrana**

1. ***Fagonia bruguieri*** DC., Prodr. 1: 704 (1824).
Vernacular names: duraymāh.

Description: Perennial or ?annual, with a woody base and annual stems arising and branching from the base; branches ± ascending to prostrate, growing horizontally from the main stem, sulcate, with small white ± glandular hairs. Leaves 3-foliolate, becoming 1-foliolate in the upper parts of the branches; leaflets 3–5 × ± 1 mm, lanceolate to linear-lanceolate, apex acute with a small white spine; petiole ± 1 mm; stipular spines 3–10 mm (4 at each node). Flowers purple to pink, about 1 cm across, solitary in the axils of leaves; pedicel 1–2 mm, elongating to ± 3 mm in fruit. Sepals 2–2.5 mm, narrow triangular. Petals about twice the length of the sepals. Capsule 2.5–4 mm, triangular, 5-angled, with a persistent style, opening by 5 valves, reflexed at maturity or not.

Flowering and fruiting: February to April; September.

Distribution and habitat: Throughout Oman, in sandy and gravelly plains, sandy depressions; common after rain. *Altitude*: 40–300 m. Distributed from Pakistan westwards to the arid regions of tropical Africa. Elsewhere in the Arabian Peninsula found in Bahrain, Kuwait, Qatar, Saudi Arabia, UAE, Yemen.

Distribution map & Illustration: 501.

Notes: Throughout the range of its distribution the species is very variable in the size of the leaflets and length of spines. The Oman plants are fairly constant in their characters. I have included *F. bruguieri* var. *laxa* Boiss. (1867) under this species.

2. ***Fagonia schweinfurthii*** (Hadidi) Hadidi, Oester. Bot. Z. 121: 272 (1973).
Synonyms: *Fagonia arabica* non. L., Edgeworth & Hook f. (1874); *F. lahovarii* Volkens & Schweinf. var. *spinescens* (Schwartz (1939); *F. indica* Burm.f. var. *schweinfurthii* Hadidi in Rech. f. (1972).
Vernacular names: derma', elghob, girsot, leghob, 'otot (Jibbālī, also for other *Fagonia* species).

Description: Perennial subshrub with a woody base and annual stems arising from the base; branches ± prostrate, sulcate, minutely pubescent, ± glandular. Leaves 3-foliolate (more or less throughout the plant); leaflets 5–15 × 1.5–2 mm, lanceolate to linear-lanceolate, apex with or without a white spine; petiole 2–6 mm, shorter in the upper leaves; stipular spines 3–10 mm. Flowers pale magenta to pink to white, about 1 cm across, solitary in the axils of leaves; pedicel 4–5 mm, elongating in fruit. Sepals 2–2.5 mm, triangular. Petals about twice the length of the sepals. Capsule 3.5–4.5 mm, triangular, 5-angled, minutely glandular, with a persistent style, and persistent sepals, opening by 5-valves, reflexed at maturity.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, in the drier areas, in sandy and gravelly locations, saline sandy coastal areas and edges of saline pools and in the higher plateau areas. *Altitude*: 50–950 m. Distributed from NE tropical Africa eastwards to Iran, Afghanistan, Pakistan and India. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map: 502.

Notes: The whole plant has been used in traditional medicine to treat venereal diseases and ear infections.

3. ***Fagonia indica*** Burm. f., Fl. Indica 102, t. 34, f. 1, (1768).
Synonyms: *Tribulus parviflora* Boiss. (1849).
Vernacular names: mushikkā'a, shaka', shuka'.

Description: Perennial subshrub with a woody base and annual stems arising and branching from the base, up to 40 cm; branches erect, spreading, sulcate, glabrous to minutely glandular. Leaves 1-foliolate; leaflets 5–10 × 0.5–2 mm, lanceolate to linear-lanceolate, apex acute, sessile to shortly petiolate; stipular spines 8–20 mm. Flowers purple to pink, or white, about 1 cm across, solitary in the axils of leaves; pedicel 5–6 mm, elongating in fruit. Sepals 2.5–3.5 mm, narrow triangular, ± mucronate. Petals about twice the length of the sepals. Capsule 4–5 mm, triangular, 5-angled, with a persistent style, pubescent, opening by 5-valves, deflexed at maturity.

Flowering and fruiting: January to May; September to October.

Distribution and habitat: Throughout Oman, in sandy and gravelly plains, sandy depressions; common after rain. *Altitude*: 10–300 m. Distributed from Pakistan westwards to the arid regions of tropical Africa. Elsewhere in the Arabian Peninsula found in Bahrain, Kuwait, Qatar, Saudi Arabia, UAE, Yemen.

Distribution map & Illustration: 503.

Notes: This is one of the most widespread species in Oman. It is grazed only when other plants are absent or low, and its dominance in several areas is an indication of overgrazing. I have included material from Oman identified as *F. paulayana* Wagner & Vierh. under this species. The leaves, stems and roots have been used in traditional medicine for treating abdominal colic, dyspepsia, fever and venereal diseases.

4. ***Fagonia ovalifolia*** Hadidi in Rech.f., Fl. Iran. 98: 2, t. 1. (1972).
Synonyms: *Fagonia ovalifolia* Hadidi var. *qatarensis* Hadidi (1978).
Vernacular names: ʿalaw, al ʾalawah, bāwīw, ḥalawi (Harsūsī).

Description: Annual or short-lived perennial subshrub with a somewhat woody base and producing annual stems, up to 20 cm; branches ± prostrate, spreading, sulcate, minutely glandular. Leaves 1-foliolate; leaflets 7–17 × 3–8(–13) mm, broadly lanceolate to ovate, apex acute, base tapering; basal leaves petiolate, upper leaves sessile; petiole up to 1 cm; stipular spines up to 12 mm. Flowers pink to white, about 1 cm across, solitary in the axils of leaves; pedicel 2–5 mm, elongating in fruit. Sepals 2.5–3 mm, narrow triangular. Petals about twice the length of the sepals. Capsule 1.5–2 mm, triangular, 5-angled, with a persistent style, pubescent, opening by 5-valves, deflexed at maturity.

Flowering and fruiting: January to March; September to October.

Distribution and habitat: Throughout Oman, in sandy and gravelly plains, sandy depressions; coming up after rain, widespread but not common. *Altitude*: 50–300 m. Distributed in Iran, Afghanistan and Pakistan. Elsewhere in the Arabian Peninsula found in Bahrain, ?Kuwait, Qatar, Saudi Arabia, UAE, Yemen (S).

Distribution map & Illustration: 504.

5. ***Fagonia luntii*** Bak., Kew Bull. 1894: 330 (1894).
Synonyms: *Fagonia nummularifolia* Bak. (1895); *F. socotrana* (Balf.f.) Schweinf. (1899); *F. socotrana* var. *somalica* Sprague (1908).

Description: Annual or short-lived perennial subshrub with a somewhat woody base and annual stems, up to 40(–50) cm; branches erect to ascending, spreading, sulcate, minutely glandular. Leaves 1-foliolate, fleshy, minutely glandular or glabrous; leaflets 7–20 × 5–18 mm, broadly ovate to rotund, apex rounded, base rounded; petiole 2–3 mm; stipular spines absent or

small (± 1 mm), often recurved. Flowers purple to pink, about 1.5 cm across, solitary in the axils of leaves; pedicel 4–5 mm, elongating to 10–12 mm in fruit. Sepals 2–2.5 mm, triangular. Petals about three times the length of the sepals, obovate, shortly clawed. Capsule 5–5.5 mm, triangular, 5-angled, with a persistent style, pubescent and ± glandular, opening by 5 valves, deflexed at maturity.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, on rocky slopes of the coastal limestone hills, and on coastal plains. *Altitude*: 10–800 m. Distributed in NE Africa (Somalia and Djibouti). Elsewhere in the Arabian Peninsula found in Yemen. Also found on Soqotra.

Distribution map & Illustration: 505.

6. ***Fagonia mahrana*** Beier, Nordic J. Bot. 21(5): 451, 1 (2002).

Description: Subshrub with a somewhat woody base and annual stems, up to 30(–40) cm; branches ascending, spreading, sulcate, glabrous, green to often purple-red. Leaves 1-foliolate, 4–25 × 1–3 mm, linear, flat, cuneate at base mucronate at apex, fleshy, glabrous, reddish to greenish red; petiole absent; stipules erect, small (± 1.5 mm), acuminate, not spinescent. Flowers purple to pink, about 1.5 cm across, solitary in the axils of leaves; pedicel 2.5–3.5 mm, thickened and wide towards the base, deflexed in fruit. Sepals ± 2.5 mm, lanceolate, apiculate, deciduous, glabrous or with a few glandular hairs when young. Petals about twice the length of the sepals, oblong, shortly clawed, apiculate. Capsule 2.5–3.5 × 3–4 mm, obconical, 5-angled, with a persistent style, pubescent, opening by 5 valves, deflexed at maturity.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, on rocky slopes of the coastal limestone hills, and on coastal plains. *Altitude*: 10–400 m. A regional endemic, distributed in Dhofar and the Mahrah region of SE Yemen.

Distribution map & Illustration: 506.

Notes: A species distinct in its purple-red stems and leaves and lack of spinescent stipules. The name of this species is based on a specimen collected from Yemen, Mahrah region, by M. Thulin, B.-A. Beier & M.A. Hussein 9729 (holotype UPS, isotype K).

5. **Melocarpum** (Engl.) Beier & Thulin
2 species confined to the Horn of Africa and southern Arabia.

Melocarpum robecchii (Engl.) Beier & Thulin, Pl. Syst. Evol. 240: 37 (2003).
Basionym: *Zygophyllum robecchii* Engl., Ann. Ist. Bot. Roma 7: 14 (1897).

Description: Perennial shrub, up to 1.5 m; stems green-yellow. Leaves 1-foliolate, succulent, glabrous; shortly petiolate or sessile; leaflets 7–15 × 11–16 mm, rotund to broadly obovate, base rounded, apex rounded, glabrous; stipules fused. Flowers solitary in the axils of leaves, ± 5 mm across, purple to pink, fading white; pedicel 4–10 mm. Sepals 2.5–3 mm, obovate, glabrous, greenish yellow. Petals 10–11 mm, obovate, shortly clawed. Stamens with a scale-like appendage at the base. Capsule 5–7 mm, 5-angled, glabrous, becoming yellow to brownish yellow at maturity.

Flowering and fruiting: August to October.

Distribution and habitat: Southern Oman, Dhofar, in sandy and gravelly wadi beds, and coastal hills, with *Acacia* and *Commiphora*. *Altitude*: 20–1000 m. Distributed in Somalia and Ethiopia. Elsewhere in the Arabian Peninsula found in Yemen.

Distribution map & Illustration: 507.

Notes: Not common or widespread in Dhofar; easily recognized by its rounded succulent leaves and large purple flowers. Cultivated at Sultan University Botanic Garden from wild-collected seed from Dhofar.

6. **Tetraena** Maxim.
About 40 species distributed from the Canary Islands and South Agfrica to China.

1. Leaves 2-foliolate (some 1-foliolate in the upper branches, but 2-foliolate leaves always present)
   2. Leaves terete
      3. Plant with stems and leaves densely pubescent; capsule 7–10 mm. 2. **T. hamiense**
      3. Plant with stems and leaves glabrous or nearly so; capsule smaller than above
         4. Capsule 2–3 mm, oblong to obconical, 5-lobed above . . . . . .1. **T. album**
         4. Capsule 6–7(–12) mm, oblong, unlobed or obscurely 5-lobed .3. **T. qatarense**
   2. Leaves obovate with tapering base and rounded apex . . . . . .4. **T. decumbens**
1. Leaves 1-foliolate; leaves terete (annual herb) . . . . . .5. **T. simplex**

1. ***Tetraena alba*** (L.f.) Beier & Thulin, Pl. Syst. Evol. 240: 35 (2003).
Basionym: *Zygophyllum album* L.f. (1762) & L., Sp. Pl. ed. 2: 551(1762).
Synonyms: *Zygophyllum proliferum* Forssk. (1775).
Vernacular names: harm, theromed (also for other species of *Tetraena*).

Description: Perennial glaucous, succulent shrub, up to 50 cm, branching profusely. Leaves 2-foliolate, paripinnate, and 1-foliolate; petiole 5–6 mm or longer than the leaflets, thickened; leaflets 5–8 mm, ± terete, succulent, glabrous; stipules membranous. Flowers solitary in the axils of leaves, white, 6–8 mm across; pedicel ± 4 mm. Sepals 1.5–3 mm, narrow triangular, pubescent and ciliate. Petals oblong to obovate, about as long as the sepals. Stamens with a scale-like appendage at the base. Capsule 2–3 mm, oblong to obconical, 5-angled or 5-lobed above, septicidally dehiscent.

Flowering and fruiting: September to March.

Distribution and habitat: Northern and Southern Oman in the drier areas, parts of the western desert, in sandy depressions, gravelly and sandy wadi beds, usually saline ground; more common in Dhofar than in northern Oman, but altogether a rare species in Oman. *Altitude*: 200–300 m. Distributed in N & NE Africa to NE Spain. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen; expected to occur in the UAE. Also found on Soqotra.

Distribution map & Illustration: 508.

Notes: Material identified as *T. alba* is distinct from *T. qatarensis* and *T. hamiense* (described below), however due to the succulence of the plant, some material is not preserved well, especially the diagnostic capsules, and therefore difficult to identify correctly. I have seen *T. alba* in the field, but only in the south-western desert where it is not common. Due to its overall resemblance to *T. hamiense* it is often confused with it and not collected, but it is distinct in its 5-angled capsules which are not so in *T. hamiense*. Radcliffe-Smith 5831 identified as *Z. prismaticum* Chiov. is referable under this species.

2. ***Tetraena hamiensis***(Schweinf.) Beier & Thulin, Pl. Syst. Evol. 240: 35 (2003).
Basionym: *Zygophyllum hamiensis* Schweinf. (1899).
Vernacular names: harm, theromed (also for other species of *Tetraena*).

Description: Perennial grey-green, succulent shrub, up to 50 cm, branching profusely, pubescent. Leaves 2-foliolate, paripinnate, sometimes also 1-foliolate; petiole 4–5 mm, thickened; leaflets 5–10 mm, ± terete, succulent, pubescent to glabrous; stipules membranous. Flowers solitary in the axils of leaves, white; pedicel ± 3 mm. Sepals 5–5.5 mm, triangular, densely pubescent. Petals oblong to obovate, about as long as the sepals. Stamens with a scale-like appendage at the base. Capsule 7–10 mm, oblong, truncate at apex, obscurely 5-angled, septicidally dehiscent.

Flowering and fruiting: September to March.

Distribution and habitat: Central and southern Oman, in the drier areas of the north facing slopes of Dhofar and parts of the western desert, on low sand dunes, gravelly and saline sandy depressions, and sandy wadi beds; also found on the exposed limestone summit in eastern Dhofar. *Altitude*: 150–950 m. Distributed in Somalia and Iran. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen; expected to occur in the UAE.

Distribution map & Illustration: 509.

Notes: This species is characteristic of the south-western sandy desert in Oman. It is often yellowish green or brownish in colour and easily identified by its long capsules which are not angled.

3. ***Tetraena qatarensis*** (Hadidi) Beier & Thulin, Pl. Syst. Evol. 240: 36 (2003).
Basionym: *Zygophyllum qatarensis* Hadidi (1978).
Synonyms: *Zygophyllum coccineum* auct. non L.; *Z. smithii* Hadidi, nom. nud. Type: Masirah Island, Jebel Hamra, Radcliffe-Smith 4233 (holotype K, ON); *Z. hamiensis* var. *qatarensis* (M.N.Hadidi) Jac. Thomas & Chaudhary (2001).
Vernacular names: harm, theromed.

Description: Perennial succulent shrub, up to 50 cm, branching profusely, green, yellow-green or glaucous. Leaves 1-foliolate or sometimes 2-foliolate, glabrous to sparsely pubescent; petiole ± equal to the leaflets, thickened; leaflets 4–8 mm, ± terete or cylindrical to ovoid, or globose, succulent, glabrous; stipules membranous. Flowers solitary in the axils of leaves, white; pedicel 1.5–2 mm. Sepals 2–2.5 mm, oblong, glabrous. Petals oblong to obovate, about as long as the sepals or slightly longer. Stamens with a scale-like appendage at the base. Capsule 6–7(–12) mm, oblong to obscurely obconical, obscurely 5-angled, flattened at apex, septicidally dehiscent, becoming yellow to brownish yellow at maturity.

Flowering and fruiting: More or less throughout the year.

Distribution and habitat: Throughout Oman, including Musandam, and offshore on Masirah and Al Halaniyah, in the foothills, central plains and coastal areas, in sandy and gravelly plains, wadi beds, sandy depressions; widespread and common. *Altitude*: 10–500 m. Distributed in the Arabia in Bahrain, Kuwait, Qatar, Saudi Arabia, UAE, Yemen.

Distribution map & Illustration: 510.

Notes: This is one of the most common plants of the plains in Oman. It is not readily grazed by livestock, and camels graze it only when other fresh fodder is unavailable; its dominance often indicates overgrazing. Near coastal areas the leaflets become globose and reddish in

colour (forms identified as *Z. smithii*)

The name of this species is based on a specimen collected from near Doha, Qatar by L. Boulos 10953 (holotype K, isotypes CAI, FI).

4. ***Tetraena decumbens*** (Delile) Beier & Thulin, Pl. Syst. Evol. 240: 35 (2003).
Basionym: *Zygophyllum decumbens* Delile (1813).

Description: Perennial succulent herb, glaucous, with prostrate branches up to 30 cm. Leaves 2-foliolate, succulent, glabrous; petiole 4–8 mm; leaflets 5–12 × 4–10 mm, obovate, base tapering, apex rounded, glabrous; stipules ± 2 mm, membranous. Flowers solitary in the axils of leaves, ± 5 mm across, white; pedicel 3–4 mm. Sepals 2–3 mm, oblong, glabrous, greenish yellow. Petals oblong to obovate, about one and a half times as long as the sepals. Stamens with a scale-like appendage at the base. Capsule 3–5 mm, obconical, obscurely 5-angled, flattened at apex, septicidally dehiscent, becoming yellow to brownish yellow at maturity.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, and offshore on Al Halaniyah, in drier areas, sandy and gravelly wadi beds, and sandy depressions. *Altitude*: 150–850 m. Distributed in Sudan, Somalia, Egypt. Elsewhere in the Arabian Peninsula found in ?Saudi Arabia, Yemen. Also found on Soqotra.

Distribution map: 511.

Notes: Not common or widespread in Dhofar, but easily recognized by its rounded succulent leaves.

5. ***Tetraena simplex*** (L.) Beier & Thulin, Pl. Syst. Evol. 240: 36 (2003).
Basionym: *Zygophyllum simplex* L., Mant. 1: 68 (1767).
Vernacular names: abu rukaiba, arid, batbāk, eribel, harm, kharmēl; kelkol, qarmal, ratreet, selaḥ, selṭoḥ, teḥit (Jibbālī).

Description: Annual herb, with prostrate branches up to 30 cm, glabrous, often becoming reddish. Leaves uni-foliolate, sessile, vivid to yellow-green, glabrous; leaflets 8–22 mm, ± terete, succulent; stipules linear, membranous. Flowers solitary in the axils of leaves, yellow, 2–3 mm across; pedicel ± 2 mm. Sepals ± 3 mm, triangular, glabrous. Petals oblong to obovate, about as long as the sepals. Stamens with a scale-like appendage at the base. Capsule 2.5–3 mm, oblong to obconical, 5-angled, minutely granulate, septicidally dehiscent.

Flowering and fruiting: September to March.

Distribution and habitat: Throughout Oman, including Musandam and the Islands Masirah and Al Halaniyah, in sandy depressions, and gravelly and sandy wadi beds; common and coming up after rain. *Altitude*: 50–200 m. Distributed in N & NE Africa eastwards to western Asia and India. Elsewhere in the Arabian Peninsula found in ?Bahrain, Kuwait, Qatar, Saudi Arabia, UAE, Yemen.

Distribution map & Illustration: 512.

Notes: The extract of leaves has been used in traditional medicine to treat infected or swollen eyes.

6. **Seetzenia** R. Br ex Decne.
Single species, distributed from N Africa south to Mauritiana, Somalia, and S Africa; Arabia, Afghanistan and Pakistan.

Seetzenia lanata (Willd.) Bullock, Kew Bull. 19: 204 (1965).
Basionym: *Zygophyllum lanatum* Willd. (1799).

Description: Annual herb with ± prostrate branches, up to 15 cm, glabrous to pubescent. Leaves 3- foliolate; stipules triangular; leaflets 3–6 × 2–4 mm, obovate, apex rounded, apiculate, base unequal, cuneate. Flowers solitary in the axils of leaves. Sepals 2.5–3 mm, linear-oblong. Petals absent. Stamens 5; filaments without a basal scale. Capsule 6–6.5 × 4–5 mm, broadly oblong, with longitudinal green bands.

Flowering and fruiting: February to March.

Distribution and habitat: Northern Oman, in the plains on the Batinah, along seasonal runnels in wadis, sandy depressions. *Altitude*: 20–200 m. Distributed from Egypt, Libya to Arabia, Afghanistan, Pakistan and India; also in S Africa. Elsewhere in the Arabian Peninsula found in Kuwait, Qatar, Saudi Arabia, UAE, Yemen.

Distribution map: 513.

66. **Geraniaceae** (by A. Patzelt)

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Key to the genera of Geraniaceae in Oman

1. Leaves palmately divided; stamens 10; beaks of mericarps rolling upwards. 1.**Geranium**
1. Leaves pinnately lobed or, if unlobed, then pinnately veined; stamens 5 or 15
   2. Leaves unlobed; stamens 15; beak of fruit plumose . . . . . .2. **Monsonia**
   2. Leaves lobed or pinnatifid; stamens 5; beak of fruit not plumose . . . . . .3. **Erodium**

1. **Geranium** L.
About 300 species, cosmopolitan, especially in the Mediterranean region to China, South Africa and Andean South America.

1. Mericarps without incurved toothed wings, strongly transversely rugose, the ridges with short longitudinal crests . . . . . .1.**G. mascatense**
1. Mericarps with incurved toothed wings along the edges
   2. Mericarps each with 2 recurved horn-like appendages at the apex
      . . . . . .3. **G. biuncinatum**

2. Mericarps without horn-like appendages at the apex . . . . . .2. **G. trilophum**

1. ***Geranium mascatense*** Boiss., Pl. Nov. Ser. 1(1): 59 (1842).
Vernacular names: shuwayb al ḥammām, sibbaḥ.

Description: Annual herb with prostrate or ascending stems. Leaves long-petiolate, orbicular in outline, ± 5 cm in diameter, blade usually 5-lobed, the lobes divided to about two-thirds of the radius; lobes 3–10 mm wide at the base, obovate, pinnatifid in upper part, pubescent with spreading hairs and glands. Inflorescence (1–)2-flowered; peduncle 0–5 cm long. Sepals narrowly ovate, 4–6 × 1–3 mm, mucronate. Petals 6.5–8 mm, mauve or pink with a dark purple centre. Mericarps 3–3.5 mm long, brown to black, strongly reticulate, the ridges minutely pubescent and with short longitudinal crests; mature beak 8–14 mm long. Seeds ± 2.5 mm long, minutely reticulate, brown.

Flowering and fruiting: January to April in northern Oman; September to November in Dhofar.

Distribution and habitat: Northern Oman, and Dhofar, in shaded areas in wooded grassland and evergreen bushland, usually at higher altitudes; common as a weed of cultivated fields. *Altitude*: 0–2000 m. Distributed from East Africa and southern Arabia to Iran and Pakistan. Elsewhere in the Arabian Peninsula found in Saudi Arabia, UAE, Yemen.

Distribution map & Illustration: 514.

2. ***Geranium trilophum*** Boiss., Pl. Nov. Ser. 1(4): 30 (1845).
Synonyms: *Geranium yemense* Deflers (1889).

Description: Annual herb with erect or ascending stems, pubescent with short hairs and longer often glandular hairs. Leaves long-petiolate, orbicular in outline, pubescent, ± 5 cm in diameter; blade usually 5- lobed, the lobes divided to about two-thirds of the radius. Inflorescence (1–)2-flowered; peduncle 0–5 cm long, glandular-pilose. Sepals narrowly ovate, to 10 mm long in fruit, 2-fid, mucronate. Petals 6–10 mm long, mauve or pink with a dark purple centre. Mericarps 4–6 mm long, orange, glabrous, with strongly incurved dentate wings; mature beak 8–13 mm long. Seeds 2–3 mm long, minutely reticulate, brownish.

Flowering and fruiting: February to April in northern Oman; September to November in southern Oman.

Distribution and habitat: Northern Oman, including Musandam, and Dhofar, in open scrub on mountain slopes. *Altitude*: 0–900 m. Distributed from East Africa to Arabia and Iran. Elsewhere in the Arabian Peninsula found in Saudi Arabia, Yemen. Also found on Soqotra.

Distribution map: 515.

3. ***Geranium biuncinatum*** Kokwaro, Webbia 25(2): 639 (1971).
Synonyms: *G. yemense* sensu Schwartz.
Vernacular name: ṣefēq, ṣefiqet (Jibbālī).

Description: Annual herb with erect or ascending stems, pubescent with short hairs and longer often glandular hairs. Leaves orbicular in outline, ± 5 cm in diameter, blade usually 5-lobed, the lobes divided to about two-thirds of the radius, lobes 5–12 mm wide at the base, obovate, pubescent; petioles long. Inflorescence 1–3-flowered; peduncle 0–4 cm long, glandular hairy. Sepals narrowly ovate, to 10 mm long in fruit, sepals 2-fid, mucronate. Petals 6–9(–10) mm, mauve or pink with a dark purple centre. Mericarps 5–7 mm, orange, glabrous, with strongly

dentate wings along the edges, and with 2 curved horn-like appendages at the apex, 2–4 mm long, becoming detached from the beak-like style at maturity; mature beak 9–13 mm long. Seeds 2–3 mm long, minutely reticulate, brownish.

Flowering and fruiting: September to November.

Distribution and habitat: Southern Oman, Dhofar, in open scrub with *Ruttya fruticosa* and *Maytenus dhofarica*. *Altitude*: 600–900 m. Distributed from East Africa to southern Arabia. Elsewhere in the Arabian Peninsula found in Yemen. Also found on Soqotra.

Distribution map: 516.

2. **Monsonia** L.
About 60 species distributed in southern Africa, Madagascar, Arabia and S Iran eastwards to W India.

Leaves ovate-cordate; main veins not deeply impressed, the blade surface not pleated; indumentum greenish-grey; beak of mericarp 6–9 cm . . . . . .1. **M. heliotropioides**
Leaves ovate-oblong; main veins deeply impressed, giving the leaf surface a pleated appearance; indumentum silvery; beak of mericarp 4–5 cm . . . . . .2. **M. nivea**

1. ***Monsonia heliotropioides*** (Cav.) Boiss., Fl. Orient. 1: 897 (1867).
Basionym: Geranium heliotropioides Cav. (1787).
Vernacular names: shajarat al ghul; qernawţ (Harsūsī).

Description: Small, erect perennial, up to 20 cm tall, greyish-green; stems stout and woody below. Leaves opposite, long-petiolate, broadly ovate to cordate, 1–2 × as long as wide, 10–34 × 9–30 mm, apex obtuse to acute, often mucronate, base cordate or truncate, margin serrate to crenate, often sinuate to lobed, red tinged at the margin, veins often densely pilose; petiole and undersurface of leaf villous but not silvery canescent. Flowers 8–12 in long pedunculate axillary umbels, peduncles and pedicels with the same indumentum as stems, often red-tinged, mostly geniculate under the fruit. Sepals ovate to obovate, 3–4 × 2–2.5 mm. Petals ± 1.5 × 1–2 mm, mauve to pink. Fruits 6.5–9 cm, mericarps 5–6 × 1–1.5 mm; beak 6–8.5 cm long, brown, plumose. Seeds obovoid, glabrous.

Flowering and fruiting: September to May.

Distribution and habitat: Northern and Central Oman, common in sandy and gravely areas, in wadis and cultivated areas. *Altitude:* 0–550 m. Distributed from the desert regions in North Africa and Arabia to Pakistan. Elsewhere in the Arabian Peninsula found in Qatar, Saudi Arabia, Yemen.

Distribution map & Illustration: 517.

Notes: A species variable in the shape and size of leaves.

2. ***Monsonia nivea*** (Decne.) Decne. ex Webb, Fragm. Fl. Aethiop.-Aegypt. 2: 59 (1854).
Basionym: Erodium niveum Decne. (1835).

Description: Ascending to erect perennial; stems white lanuginose, up to 30 cm high, appressed pubescent. Lower leaves alternate, upper leaves subopposite to opposite, petiolate, narrowly ovate to oblong-elliptical, 1.5–3 × as long as wide, 10–30 × 5–15 mm with the main veins deeply impressed, densely white lanuginose, apex acute or rarely obtuse, base truncate, margin serrate to crenate, sometimes reddish tinged at the margin; petioles of lower leaves exceeding

the blade, those above shorter. Inflorescences with 2–12 flowers on peduncles to 15 cm long, with white indumentum; fruiting pedicels 3–20 mm long, often geniculate under the fruit. Sepals 3–4 × 2–3 mm, ovate to obovate, mucronate, tapering to base, densely covered with white, mostly appressed hairs. Petals 1.5–3 × 1–2 mm, mauve to pink. Fruits 40–55 mm; mericarps 5–6 × 1.8–2 mm, beak 35–50 mm, brown, pubescent, plumose. Seeds obovoid, glabrous.

Flowering and fruiting: January to April.

Distribution and habitat: Northern Oman, fairly common in wadis and deep or shallow sands. *Altitude*: 100–600 m. Distributed from Africa and Arabia to Iran and Pakistan. Elsewhere in the Arabian Peninsula found in Bahrain, Kuwait, Qatar, Saudi Arabia, UAE, Yemen.

Distribution map & Illustration: 518.

3. **Erodium** l'Hérit. ex Aiton

A genus of about 90 species, distributed from Europe to Sudan and Ethiopia, east to Mongolia and N China; S and C Australia; also Texas to S Utah, California, N Mexico, Brazil, Uruguay and N Argentina; some weedy species widely distributed.

1. Leaves subentire to shallowly 3–5-lobed. [Pit and furrow of mericarp with glands; beak of fruit 2–3 cm] ..... 1. **E. malacoides**
1. Leaves deeply 3-lobed or pinnatisect
   2. Leaves ± deeply 3-lobed
      3. Furrow present below the pits at apex of the mericarp ..... 2. **E. neuradifolium**
      3. Furrow below the pits absent ..... 3. **E. laciniatum**
   2. Leaves (1)–2 pinnatisect ..... 4. **E. cicutarium**

1. ***Erodium malacoides*** (L.) l'Hérit. ex Aiton, Hort. Kew. 2: 415 (1789).
Basionym: *Geranium malacoides* L. (1753).
Synonyms: *Geranium malacoides* Desf. (1789).

Description: Ascending or prostrate annual or biennial herb; stems up to 40 cm, pilose with deflexed hairs, often glandular. Leaves long-petiolate, 2–6(–9) × 1–4(–6) cm, cordate at the base, subentire to shallowly 3–5-lobed, crenate-dentate; petiole up to 6 cm long, shorter in the upper leaves. Inflorescences 3–8-flowered umbels. Sepals 3–6(–7) mm, 5-nerved, mucronate. Petals 4–6 mm, mauve. Mericarps 4–4.5 mm long, apical pit wide, glandular, with one distinct furrow below; beak 2–3 cm.

Flowering and fruiting: August to December.

Distribution and habitat: Southern Oman, Dhofar, in the dry *Commiphora* scrub, along roadsides and depressions. *Altitude*: 500–1000 m. Distributed from the Mediterranean region to Iraq, Iran and Pakistan and South Africa; naturalized weed worldwide. Elsewhere on the Arabian Peninsula found in Saudi Arabia, Yemen.

Distribution map: 519.

Notes: Apparently uncommon or undercollected in Oman.

2. ***Erodium neuradifolium*** Del. ex Godr., Fl. Juv.: 17 (1853).
Synonyms: *Erodium aegyptiacum* Boiss. (1851); *E. subtrilobum* Jord. (1852).

Description: Erect annual or biennial; stems prostrate or ascending, up to 40 cm with deflexed hairs, often glandular. Leaves long-petiolate, 2–6× 1–4 cm, cordate at the base, ± deeply 3-lobed, sometimes almost entire, the terminal segment 3–5-lobed, ± incised-dentate. Inflorescences 3–8-flowered umbels. Sepals 3.5–6 mm. Petals not much longer than the sepals, mauve. Mericarps 3–5(–6) mm, apical pits deep, eglandular or glandular, with one narrow eglandular furrow at the base; beak 2.5–4.5 cm.

Flowering and fruiting: February to March.

Distribution and habitat: Northern Oman, including Musandam, on mountain slopes and open gravel places. *Altitude*: 0–1650 m. Distributed from East Africa to the Canary Islands, and the Mediterranean Region, and eastwards to Arabia, Iraq, Iran and Afghanistan. Elsewhere in the Arabian Peninsula found in Saudi Arabia, UAE.

Distribution map: 520.

Notes: Apparently uncommon or undercollected in Oman.

3. ***Erodium laciniatum*** (Cav.) Willd., Sp. Pl.: 3: 633 (1800).
Basionym: Geranium laciniatum Cav. (1787).
Synonyms: Erodium laciniatum (Cav.) Willd. var. *involucratum* (Kunze) Willd. (1880); *E. laciniatum* (Cav.) Willd. var. *glabrescens* Post (1896).

Description: Procumbent to ascending annual or biennial herb; stems up to 45 cm, greyish-green, shortly pubescent to canescent. Leaves opposite, cordate to ovate, 2–4 × 1–3 cm, varying greatly in lobation from lower leaves mostly subentire-dentate to blades of the others pinnately divided nearly to base, often with 3–5(–7) main lobes; petioles on lower leaves exceeding the blades, those above shorter; stipules membranous, broadly ovate. Flowers in (2–)5–8-flowered umbels, peduncles exceeding the subtending leaf to 6(–10) cm; pedicels 1–3 times the length of the sepals. Sepals 4–5 mm long, mucronate, pubescent, 5-nerved. Petals 4–5 (–6) mm, distinct, pink-purple. Filaments with neither cilia nor teeth on the margin. Mericarps 4–5 mm long, short-pubescent, with 1 or 2 papillose pits at apex at insertion of the beak, furrows absent; beak 4–5(–7) cm long, beak sparsely appressed-pubescent along the inner side. Seeds brown, smooth, 2.5–3 mm long.

Flowering and fruiting: February to April.

Distribution and habitat: Northern Oman, including Musandam, found at lower altitudes in gravel areas. *Altitude*: 20–500 m. Distributed from the Middle East to Arabia, extending east into Pakistan and Afghanistan. Elsewhere in the Arabian Peninsula found in Bahrain, Qatar, Kuwait, Saudi Arabia.

Distribution map & Illustration: 521.

Notes: The species is very variable in the lobation of leaves and indumentum. The Oman specimens have been assigned to var. *pulverulentum* (Cav.) Burtt. & Lewis (= *Geranium pulverulentum* Cav., *Erodium pulverulentum* (Cav.) Willd, *Erodium subtrilobum* Jord. subsp. *pulverulentum* (Cav.) Vierh.).

4. ***Erodium cicutarium*** (L.) l'Hérit. ex Aiton, Hort. Kew. 2: 414 (1789).
Basionym: *Geranium cicutarium* L. (1753)
Synonyms: *Erodium cicutarium* subsp. *bipinnatum* (Cav.) Tourlet; *Erodium cicutarium* var. *viscidum* Nab (1923).

Description: Usually prostrate annual herb; stems procumbent, up to 50 cm, hirsute to hispid with glandular hairs. Leaves mostly basal, oblong in outline, pinnate with deeply pinnatifid leaflets, always divided for more than half-way to midrib, sparsely appressed glandular hairy; petiole 2–3 cm long; stipules ovate, hyaline, 3.5–4.5 cm long. Inflorescence in umbels with 4–6(–10) flowers; bracts broadly ovate, ciliate; pedicel 6–8 mm long, hairy, deflexed in fruit. Sepals 5, distinct, 3-veined, reticulate, 4–5 mm, pubescent at back and especially at base, terminated by 0.5 mm purple mucro. Petals 5, distinct, obovate, clawed, pink-purple to purple-violet, 3-veined, 4–5 mm. Mericarps 3.5–4.5 cm, hairy, apical pit eglandular, furrow below apical pit absent or present; beak 3–4(–7) cm, with bristles along the inner side. Seeds brown, smooth, ± 2.5 cm.

Flowering and fruiting: February to March.

Distribution and habitat: Northern Oman, including Musandam in shaded and damp locations, fields and tracks. *Altitude*: 0–2250 m. Distributed from Europe and the Mediterranean to Arabia and the Middle East; a naturalized weed worldwide. Elsewhere in the Arabian Peninsula found in Kuwait, Saudi Arabia, Yemen. Also found on Soqotra.

Distribution map: 522.

Notes: The characteristics of the mericarp pit and furrow are very variable. The furrow in the mericarp ranges from completely absent to deep.

Material insufficient

Erodium cf. ***touchyanum*** Del. ex Godr., Mem. Acad. Montp. (Sect. Medic). i: 423 (1853).

Description: Ascending annual herb with stems up to 50 cm long. Leaves mostly basal, oblong in outline, pinnate with deeply pinnatifid leaflets, always divided for more than half-way to midrib; petiole 2-3 cm long; stipules ovate, hyaline, 3.5–4.5 cm long. Inflorescence an umbel with 4–6(–10) flowers; sepals 5; petals 5, distinct, obovate, pink to pink-purple to purple-violet, 4–5 mm long. Mericarp ± 3.5–4.5 cm long.

Flowering and fruiting: March to April.

Distribution and habitat: Northern Oman, Musandam, in cultivated area. *Altitude*: ± 1200 m. Distributed from the Middle East to Arabia, introduced as a weed into many countries. Elsewhere on the Arabian Peninsula found in Saudi-Arabia.

Notes: This record is based on a single collection from Ashawq, Musandam, collected by Braund (ON). The material is inadequate to identify the species satisfactorily.

67. **Balsaminaceae** (by A. Patzelt)

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Impatiens L.
About 900 species, primarily in the tropical and subtropical montane forests of the Old World, but with a number of species in parts of temperate Asia, Europe and North America.

Impatiens balsamina L., Sp. Pl.: 938 (1753).
Vernacular name: ṣēfēr, ẓefeyr, ẓelowel (Jibbālī).

Description: Annual herb, up to 1 m; stem simple or branching sparsely, erect, somewhat fleshy, glabrous or pubescent when young. Leaves alternate, petiolate, 7–20 × 2–4 cm, narrowly lanceolate to narrowly elliptic or obovate, glabrous or finely pubescent, with several dark sessile glands towards the base of the lamina, apex acute, base cuneate, margin serrate-dentate; petiole 2–15 mm long. Bracts linear-lanceolate, ± 2 mm long, inconspicuous. Flowers pink to purple in 1-3-flowered axillary clusters. Pedicel 1–1.5 mm, pendent in fruit. Sepals 3, the lower boat-shaped with a long, filiform spur, 1–2.5 cm, the two lateral narrowly ovate, 2–3 mm long. Petals 5, the upper hooded, ± 1 cm with a pointed appendage, the lower lateral petals united into two pairs which form a lobed lower lip ± 2 × 2.5 cm. Stamens 5, fused into a ring around the ovary. Ovary superior, densely pubescent. Style 1, short. Fruit ovoid, 1.3–2 × 0.6 –0.8 cm, tip acute, densely pubescent, dehiscing explosively.

Flowering and fruiting: September to November.

Distribution and habitat: Southern Oman, Dhofar, on the monsoon affected escarpment mountains, in *Anogeissus* woodland, and grassland; also near habitation, along roadsides, on or near cultivated land; common annual after monsoon. *Altitude*: 100–850 m. A native of tropical India and SE Asia, widely naturalized in the tropics and subtropics. In the Arabian Peninsula found only in Oman.

Distribution map & Illustration: 523.

Notes: The juice of the plant was used in traditional medicine for treating ophthalmic inflammations, and the whole plant was used as soap.

68. **Apiaceae** (Umbelliferae)

Bibliography
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Key to the genera of Apiaceae in Oman

1. Fruit glabrous, without simple, hooked or glochidiate hairs
   2. Leaves 3-foliolate, leaflets deeply or shallowly lobed, not deeply segmented ..... **4. Apium**
   2. Leaves pinnate, with segmented leaflets
      3. Fruit flattened with thickened margins, without prominent ridges; bracts linear to ovate ..... **8. Ducrosia**

3. Fruit oblong, without thickened margins, ridges prominent; bracts and bracteoles segmented .....5. **Ammi**
1. Fruit pilose with simple, hooked, barbellate or glochidiate hairs
4. Fruit with glochidiate hairs .....7. **Adenosciadium**
4. Fruit without glochidiate hairs
5. Fruit linear-cylindrical, >1.5 cm long, scabrous .....2. **Scandix**
5. Fruit ovoid, <1.5 cm long, pilose or with hooked or barbellate hairs
6. Leaves modified into spines, or if not then fruiting stalk weak and prostrate; fruit pilose .....1. **Pycnocycla**
6. Leaves not modified into spines; fruit with hooked or barbellate hairs
7. Umbels leaf-apposed; bracts present or absent, bracteoles present; fruit with barbellate hairs .....3. **Torilis**
7. Umbels terminal or axillary, bracts and bracteoles absent; fruit with hooked hairs .....6. **Pimpinella**

1. **Pycnocycla** Lindl.

12 species distributed from Guinea east to Ethiopia and Eritrea, Arabian Peninsula east to Pakistan.

1. Plant not spiny; stem weak and prostrate .....1. **P. prostrata**
1. Plant spiny (leaf segments spine-like); robust erect plants
2. Bracts exceeding the umbel .....2. **P. aucheriana**
2. Bracts as long as, slightly smaller or longer than the umbel ..... 3. **P. caespitosa**

1. ***Pycnocycla prostrata*** Hedge & Lammond, Notes R.B.G. Edinb. 37(1): 62–63 (1978).
Type: Northern Oman, Birkat Sahfan, *Mandaville* 6624 (holotype BM, isotype ON).
Vernacular names: jizr barrī (E Hajar, Jebel Qahwan).

Description: Perennial herb, unarmed; stems weak, prostrate, flowering stalk up to 30 cm, glabrous. Leaves basal, deeply segmented, 20–30 × 7–8 mm, segments linear, dentate or entire, puberulus to glabrous; petiole 2–11(–15) cm. Flowers pink to white, in congested terminal capitate umbels, 7–10 mm in diameter. Bracts 10–16, lanceolate to linear; bracteoles 6–7, triangular-lanceolate; pedicel 5–6 mm. Calyx ± 1 mm. Petals exceeding the sepals. Stylopodium rounded. Styles 2, distinct. Fruit ± 5 mm, ovoid, pilose.

Flowering and fruiting: March to April.

Distribution and habitat: Northern Oman, in the western and eastern Hajar mountains, amongst rocks and stones, in wadi beds and in sand between rocks. *Altitude*: 1500–2500 m. Endemic to the mountains of northern Oman.

Distribution map: 524.

2. ***Pycnocycla aucheriana*** Decne. ex Boiss., Ann. Sc. Nat. ser. 3, 2: 88 (1844); Fl. Or. 2: 951 (1872).
var. ***aucheriana***

Description: Virgate shrub, forming large clumps; branches intricate, grey-green, glabrous to sparsely pubescent. Leaves rigid, divided into 3–5 spines or spine-tipped linear segments up to 5 cm; petiole up to 5 cm, sheathing and pubescent at the base. Flowers white, in congested terminal umbels, 15–20 mm in diameter, with the outer flowers male and the inner hermaph-

rodite; rays many. Bracts 5–7, 2–3 cm long, spine-like; bracteoles 4–5, spine-like, densely pubescent. Calyx densely pubescent. Petals ± 1 mm, bilobed above. Stylopodium rounded. Styles 2, distinct. Fruit ± 5 mm, ovoid, pilose.

Flowering and fruiting: March to May.

Distribution and habitat: Northern Oman, in the foothills of the western Hajar, in stony wadis, gorges and rocky slopes. *Altitude*: 500–1000 m. Distributed from Pakistan to Oman. Not found elsewhere in the Arabian Peninsula.

Distribution map: 525.

Notes: The name of this species is based on a specimen collected from Iran by Aucher-Eloy 4559 (syntypes G, K, P); the type material originates form S Iran and not Muscat (Oman) as erroneously given in Flora of Pakistan (op. cit., p. 20).

3. ***Pycnocycla caespitosa*** Boiss. & Hausskn. ex Boiss., Fl . Or. 2: 953 (1872).
Vernacular names: mujayzilah, skhāṣ.

Description: Spiny shrub, up to 30 cm; branches intricate, many arising from the base, grey-green, pubescent to glabrous. Leaves rigid, divided into 3–5 spine-tipped segments up to 5 cm; petiole up to 5 cm, sheathing at the base, pubescent. Flowers purple-pink in congested terminal umbels, 10–11 mm in diameter, with the ?outer flowers male and the inner hermaphrodite; rays many; peduncle ± 3 mm. Bracts 5–7, 5–6 mm long, spine-like, densely pubescent; bracteoles 4–5, linear, spine-like, densely pubescent. Calyx minute. Petals purple with white margins, ± 1 mm, emarginate. Stylopodium rounded. Styles 2, distinct. Fruit ± 5 mm, ovoid, pilose.

Flowering and fruiting: March to April; October.

Distribution and habitat: Northern and southern Oman, including Musandam, on rocky slopes and gorges, amongst rocks and boulders; also known from the dry north-eastern area in Dhofar. *Altitude*: 100–800 m. Distributed in SW Iran. Elsewhere in the Arabian Peninsula found in the UAE.

Distribution map: 526.

Notes: Sterile specimens from southern Oman, KSOP 287 (E, ON), TT/DF 374 (E, ON) and G. Popov 68/16 (E), probably belong under this species.

2. **Scandix L.**

About 20 species, distributed from Europe and Mediterranean east to W China, Pakistan, and Kashmir.

Scandix pecten-veneris L., Sp. Pl.: 256 (1753).
Synonyms: *Scandix persica* Mart. (1837).

Description: Annual herb up to 10 cm; stems erect, pubescent to glabrous. Leaves 3-pinnate, deeply segmented with linear lobes, entire; petiole sheathing at the base. Flowers white. Bract single, linear or absent; bracteoles several, lanceolate or linear, entire or incised. Calyx inconspicuous. Petals ± 1 mm. Stylopodium conical. Styles 2, short. Fruit 2–3 cm, linear-cylindrical, scabrous.

Flowering and fruiting: February to March.

Distribution and habitat: Northern Oman, in the northern mountains, in moist, cultivated and irrigated ground. *Altitude*: ± 2000 m. Distributed in W & C Europe, N Africa, SW Asia east to Pakistan. Elsewhere in the Arabian Peninsula found in Saudi Arabia, ?Yemen.

Flowering and fruiting: ?February to March.

Distribution map & Illustration: 527.

Notes: The plant seems to be uncommon in Oman, but it is perhaps undercollected.

3. **Torilis** Adans.
12 species, distributed in Macaronesia, Europe and Mediterranean to Himalaya and Eastern Asia; Nigeria to Somalia and south to ?S Africa.

Torilis stocksiana (Boiss.) Drude in Engl. & Prantl., Naturl. Pflanzenfam. 3(8): 156 (1898); *Basionym*: *Caucalis stocksiana* Boiss. (1859).

Description: Annual herb up to 10 cm; stems procumbent to ± erect, retrorsely setose. Leaves 3-pinnate, with deeply segmented lanceolate lobes, entire, setose; petiole sheathing at the base. Flowers purplish white, in leaf-apposed umbels. Bracts absent; bracteoles 3–7, linear, setose. Calyx conspicuous, setose. Petals ± 1 mm. Stylopodium conical. Styles 2, short. Fruit 3–5 mm, cylindrical, setose, with barbellate hairs.

Flowering and fruiting: February to March.

Distribution and habitat: Northern Oman, in the foothills of the northern mountains, in moist, cultivated and irrigated locations. *Altitude*: 500–2000 m. Distributed from Iraq, Iran, to Caucasus. Elsewhere in the Arabian Peninsula found in Saudi Arabia, ?Yemen.

Distribution map: 528.

4. **Apium** L.
About 20 species, widespread in tropical and temperate regions.

Apium graveolens L., Sp. Pl.: 264 (1753).
Vernacular names: muratab.

Description: Annual herb, up to 50 cm; stems grooved, sparingly branched, fleshy, glabrous, smelling of celery. Leaves alternate, 3-foliolate; petiole 10–15 mm, sheathing at the base; leaflets 3–6 cm long and broad, lobed with deep or shallow lobes, often 3-lobed, sinuate to entire, glabrous. Flowers white, in axillary and terminal umbels; rays 4–10. Bracts and bracteoles absent. Calyx minute. Petals ± 1 mm. Carpophore bifid. Fruit 0.75–1.5 mm, ovoid to subglobose, glabrous with prominent ridges.

Flowering and fruiting: February to March/April.

Distribution and habitat: Northern and southern Oman, in the foothills and low altitudes of the mountains, in irrigated cultivated areas, and date-groves. *Altitude*: 350–1400 m. Distributed widely in tropical and temperate regions. Elsewhere in the Arabian Peninsula found in Bahrain, Saudi Arabia, Yemen. Also found on Soqotra.

Distribution map: 529.

Notes: Wild celery is edible and is often cultivated.

5. **Ammi** L.

6 species distributed in Macronesia and Mediterranean south to Ethiopia and east to Pakistan; naturalized in Africa and Americas.

Ammi majus L., Sp. Pl.: 243 (1753).
Vernacular names: nayniyah, na'niyah.

Description: Annual herb, up to 60(–100) cm; stems grooved, glabrous. Leaves alternate, pinnately dissected; petiole 10–15 mm, sheathing at the base; leaflets 10–15(–40) × 1–5(–25) mm, lobed at the apex, entire to serrate, glabrous. Flowers white, in axillary and terminal umbels; peduncles 6–12 cm, glabrous; rays 10–30. Bracteoles of divided bracts with filiform segments. Calyx minute. Petals ± 1 mm. Carpophore bifid. Fruit ± 2 mm, oblong, with prominent ridges.

Flowering and fruiting: January to April; August to October.

Distribution and habitat: Northern and southern Oman, in the foothills and mountains, open grasslands, in wadis, gravel wadi banks, near cultivated fields, date-groves, and disturbed and grazed grasslands; often a weed of waste places. *Altitude*: 200–850 m. Widespread in the areas mentioned for the genus. Elsewhere in the Arabian Peninsula found in Saudi Arabia, UAE, Yemen.

Distribution map & Illustraton: 530.

Notes: Common, and often abundant in overgrazed areas on the Dhofar mountains. Recorded as a food plant of the larva of the butterfly *Papilio machaon* in northern Oman, but not in Dhofar.

6. **Pimpinella** L.

About 150 species distributed from Eurasia to Far East and Japan, south to Java, Bali and Phillippines, Africa, Madagascar.

Stems ascending to procumbent; leaves deeply segmented ..... 1. **P. etbaica**
Stems erect; leaves not segmented ..... 2. **P. schweinfurthii**

Pimpinella etbaica Schweinf., Verh. Zool.-Bot. Ver. Wien 18: 667 (1886).

Description: Annual herb, 5–10 cm, sometimes with a woody root-stock; stems ascending to procumbent, arising from the base, grooved grey-green, sparsely pubescent to glabrous. Leaves alternate, simple and usually lobed at the base, deeply segmented above with linear to lanceolate segments, entire, pubescent or glabrous; petiole slender, up to 4 cm, sheathing at the base. Flowers white, in axillary and terminal umbels; peduncles 5–20 mm, glabrous to sparsely pubescent; rays 3–5. Bracts and bracteoles absent. Calyx minute. Petals ± 1 mm. Stylopodium rounded. Styles 2, distinct. Fruit ± 1 mm, ovoid to subglobose, covered with hooked hairs.

Flowering and fruiting: ?April; ?September.

Distribution and habitat: Northern Oman including Musandam, and Dhofar, along roadsides and in grasslands *Altitude*: ± 300 m. Distributed in Sudan, Somalia and Ethiopia. Not found elsewhere in the Arabian Peninsula, but possibly found in Saudi Arabia.

Distribution map: 531.

2. ***Pimpinella schweinfurthii*** Aschers., Verh. Bot. Brand. 21: 67 (1880).

Description: Annual or perennial herb, up to 30 cm, with a woody root-stock; stems few arising from the base, grooved, pale green, sparsely pubescent becoming denser above with long and short hairs. Leaves alternate, usually simple, or 3-lobed; leaflets 10–30 mm long and broad, rotund, coarsely and irregularly dentate, pubescent; petiole up to 5 cm, sheathing at the base, pubescent. Flowers white, in axillary and terminal umbels; peduncles 15–30 mm, glabrous to sparsely pubescent; rays 3–5. Bracts and bracteoles absent, rarely present. Calyx minute. Petals ± 1 mm. Stylopodium conical. Styles 2, distinct. Fruit ± 2 mm, ovoid, ridges obscure, covered with long hooked hairs.

Flowering and fruiting: September to October.

Distribution and habitat: Southern Oman, Dhofar, in wadis and escarpment slopes, and on the coastal plains. *Altitude*: 100–1000 m. Distributed in Egypt. Elsewhere in the Arabian Peninsula found in SE Yemen.

Distribution map: 532.

7. **Adenosciadium** H.Wolff
A single species distributed in SE Arabia.

Adenosciadium arabicum (T.Anders.) H.Wolff in Engl. Pflanzenr., Umbell.-Apioid.-Ammin. 365 (1927).
Basionym: *Ptychotis arabica* T.Anders. (1860).
Vernacular names: şefēq, şefiqet (Jibbālī).

Description: Annual herb, sometimes with a woody root-stock, up to 50 cm; stems several arising from the base, grooved, grey-green, glabrous or pubescent. Leaves alternate, pinnately lobed; leaflets 10–25 mm long, deeply segmented to lobed with lanceolate to linear segments, entire to coarsely dentate, pubescent; petiole 2–10 cm, sheathing at the base, pubescent. Flowers white, in axillary and terminal umbels; peduncles up to 3 cm, pubescent; rays 4–10. Bracts ± 4 mm, linear; bracteoles ± 3 mm, linear. Calyx minute. Petals ± 1 mm. Stylopodium conical. Styles 2, distinct. Fruit 0.75–1 mm, ovoid to subglobose, ridged, covered with glochidiate hairs.

Flowering and fruiting: February, March; September to October.

Distribution and habitat: Southern and north-eastern Oman, in gravel wadi beds, coastal cliffs, in *Commiphora* shrubland *Altitude*: 50–200 m. A regional endemic known from Yemen (E) and Oman in SW Arabia.

Distribution map: 533.

Notes: The plant smells of celery.

8. **Ducrosia** Boiss.
5 or 6 species distributed in Syria, and from Arabia to Pakistan.

Ducrosia anethifolia (DC.) Boiss., Ann. Sc. Nat. Ser. 3, 1: 342 (1844).
Basionym: *Zozimia anethifolia* DC. (1830), non Link.

Description: Aromatic, robust annual herb with a woody root-stock, up to 50 cm; stems several arising from the base, grooved, grey-green, glabrous. Leaves alternate, 3-foliolate; petiole

10–15 mm, sheathing at the base; leaflets 20–40 mm long, deeply segmented to lobed with lanceolate to linear segments, entire, glabrous. Flowers white, in axillary and terminal umbels; peduncles up to 8 cm, glabrous; rays 6–15. Bracts linear to ovate. Calyx minute. Petals ± 1 mm. Stylopodium conical. Fruit 4–6 mm, oblong, flattened, with thickened margins.

Flowering and fruiting: February to March.

Distribution and habitat: Northern Oman, in the foothills of the eastern and western Hajar mountains, in gravelly wadi banks, coastal limestone cliffs, and sandy locations; not common. *Altitude*: ± 500 m. Distributed in Iran, Afghanistan and Pakistan. Elsewhere in the Arabian Peninsula found in Kuwait, Saudi Arabia; expected to occur in the hills of the UAE.

Distribution map: 534.

Cultivated species

Coriandrum sativum L. (1753).
Coriander (Arabic: *kusbara*) is cultivated for its leaves and powdered or whole seeds used in salads and soups.

Daucus carota L. (1753).
Carrot (Arabic: *jizr*) is widely cultivated for its tuberous root and eaten fresh, cooked or pickled.

Petroselinum crispum (Miller) A.W. Hill. (1925).
Parsley is cultivated for its leaves used in salads and soups. This is not a common herb in Arabic or Indian cookery but is gaining popularity, and is often sold in supermarkets.

Families with only cultivated species

Punicaceae

Punica granatum L. (1753).
Vernacular names: rumman; English name: pomegranate.

Pomegranate is cultivated in several villages on the Saiq plateau in the Jebel Akhdar range on the Western Hajar mountains in northern Oman. This a small tree up to 3 m tall with opposite leaves and red, somewhat fleshy flowers. The fruits with orange or pinkish fleshy seeds are sweet and sold locally in the fruit markets in Nizwa and other towns during July to October when fruits ripen. Pomegranate is indigenous to Asia but is cultivated in most of the warm tropical countries of the world. Fruit and fruit rind are used as an anthelmintic, for diarrhoea, jaundice, skin rashes and for improving vision. Seeds are used as a general health tonic, and when dried used as condiment in Indian cuisine.

Meliaceae

Azadirachta indica A.Juss. (1830).
Vernacular names: shereesh, sherish, neem.

The neem tree is an evergreen tree, up to 15 m tall with pinnately compound leaves and white fragrant flowers. Native of India and China it is cultivated in Arabia, flowering from March to May. The leaves are used in traditional medicine for the treatment of abdominal pain, colic and for reducing fevers.

Distribution Maps

Volume 2
Crassulaceae - Apiaceae

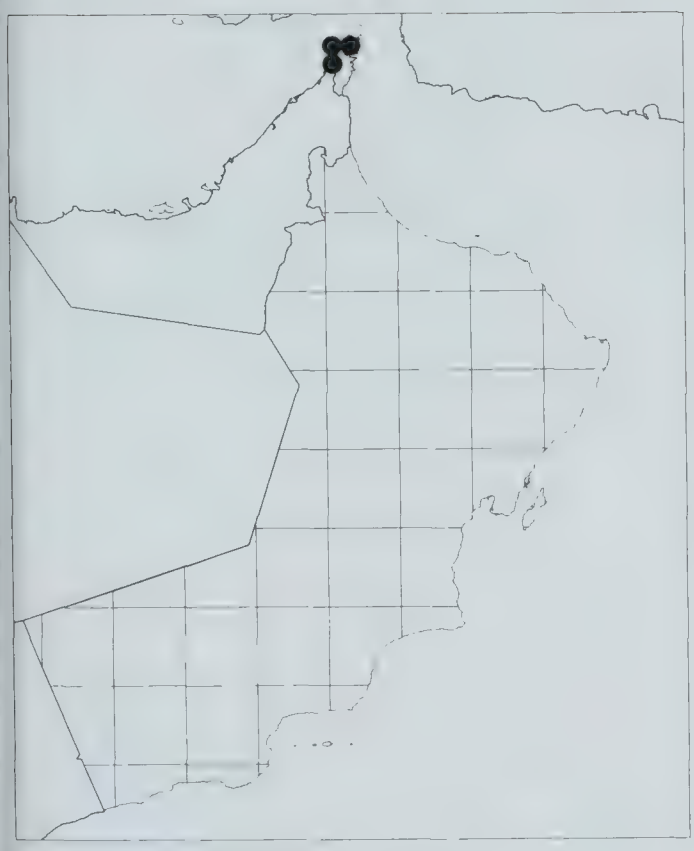


Fig. 291. Crassula alata.

Fig. 292. Sedum hispanicum.

Fig. 293. Kalanchoe glaucescens.

Fig. 294. Umbilicus horizontalis.

Fig. 295. Cotoneaster nummularia.

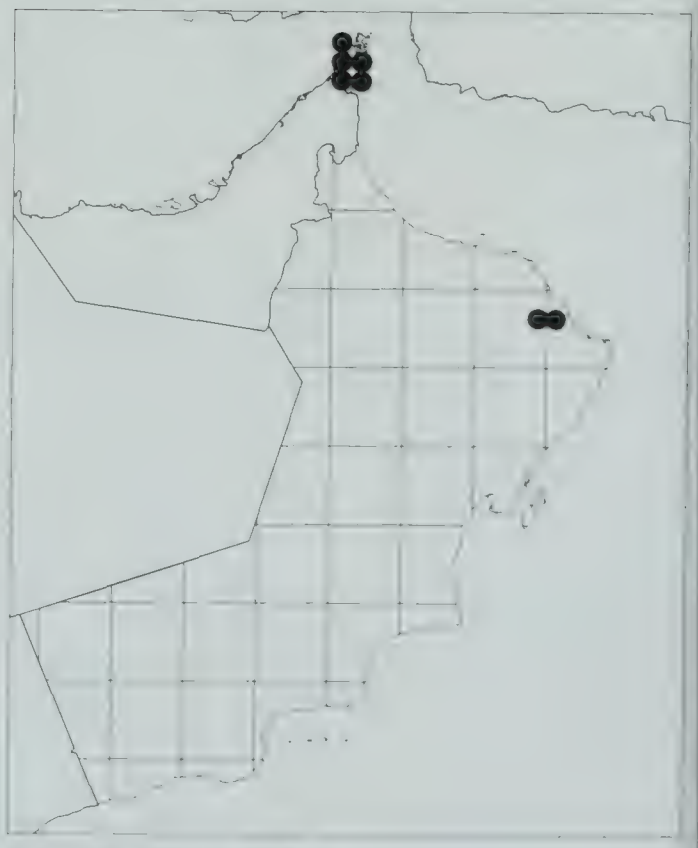


Fig. 296. Prunus arabica.

Fig. 297. Neurada procumbens.

Fig. 298. Prosopis cineraria.

Fig. 299. Dichrostachys cinerea.

Fig. 300. Acacia senegal.

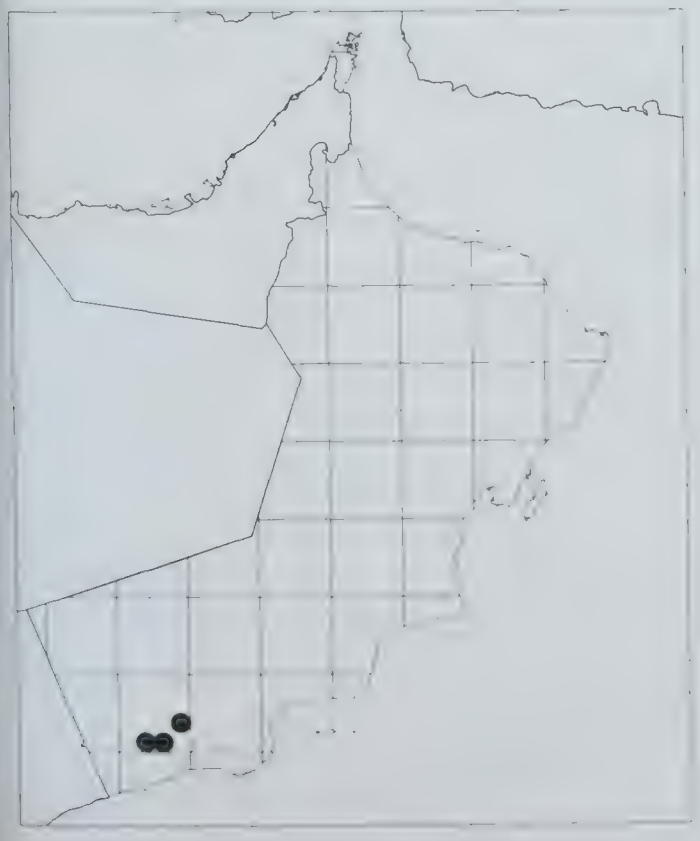


Fig. 301. Acacia hamulosa.

Fig. 302. Acacia asak.

Fig. 303. Acacia laeta.

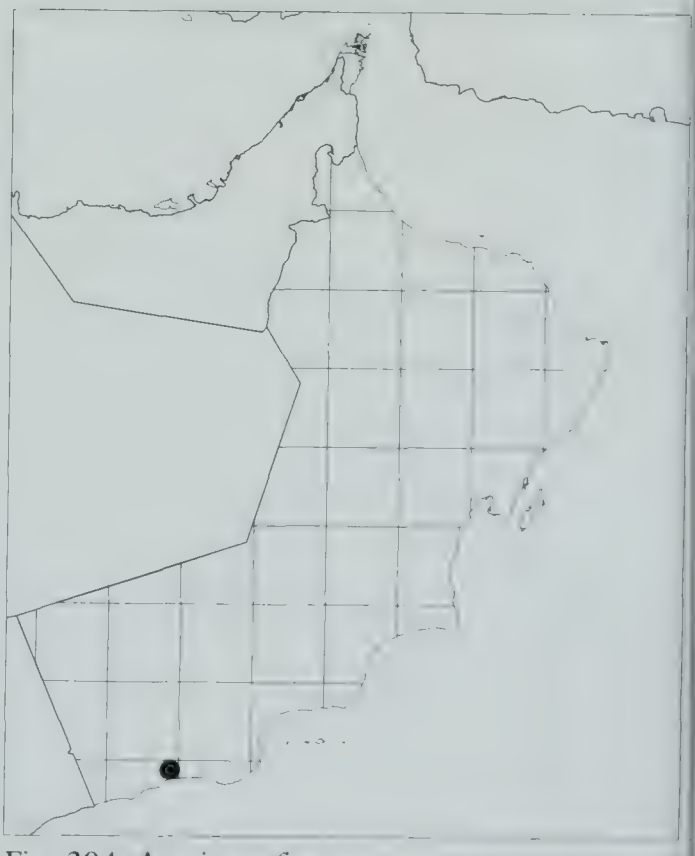


Fig. 304. Acacia oerfota.

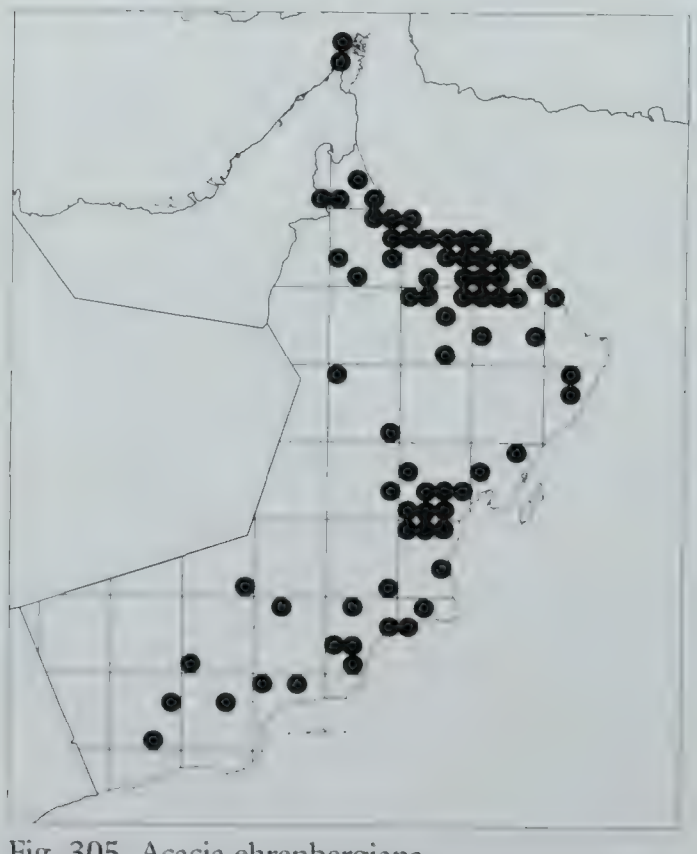


Fig. 305. Acacia ehrenbergiana.

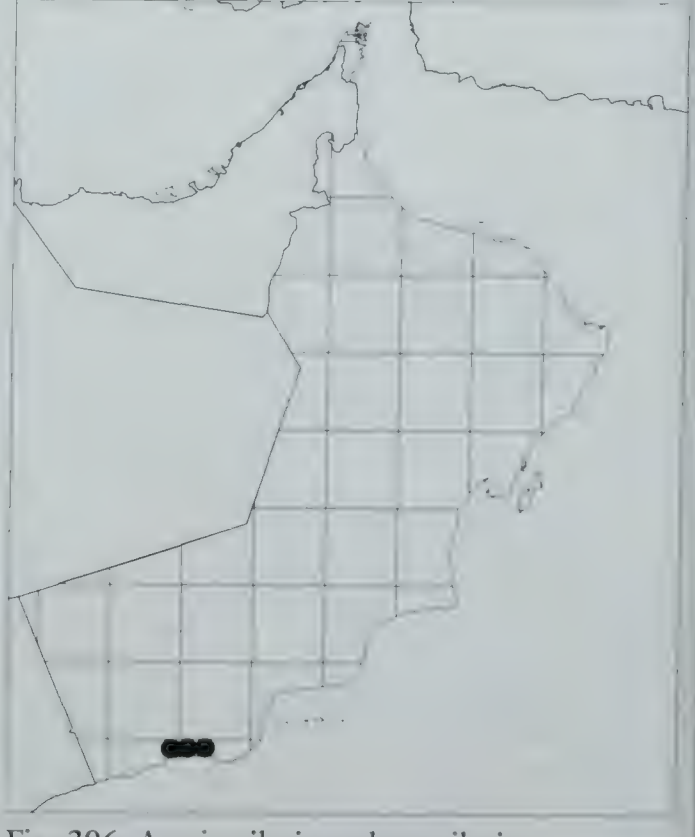


Fig. 306. Acacia nilotica subsp. nilotica.

Fig. 307. Acacia nilotica subsp. indica.

Fig. 308. Acacia nilotica subsp. kraussiana.

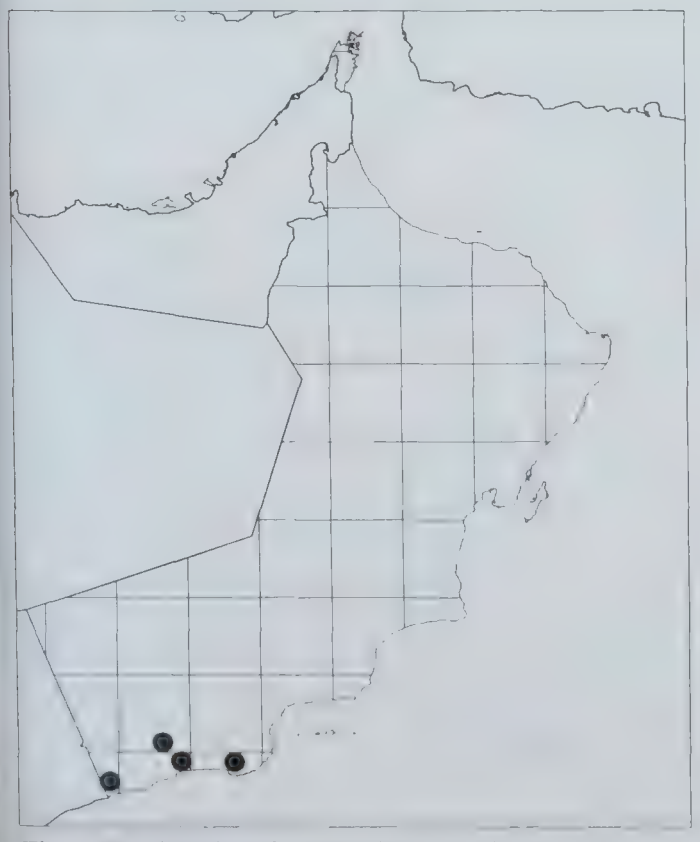


Fig. 309. Acacia etbaica subsp. uncinata.

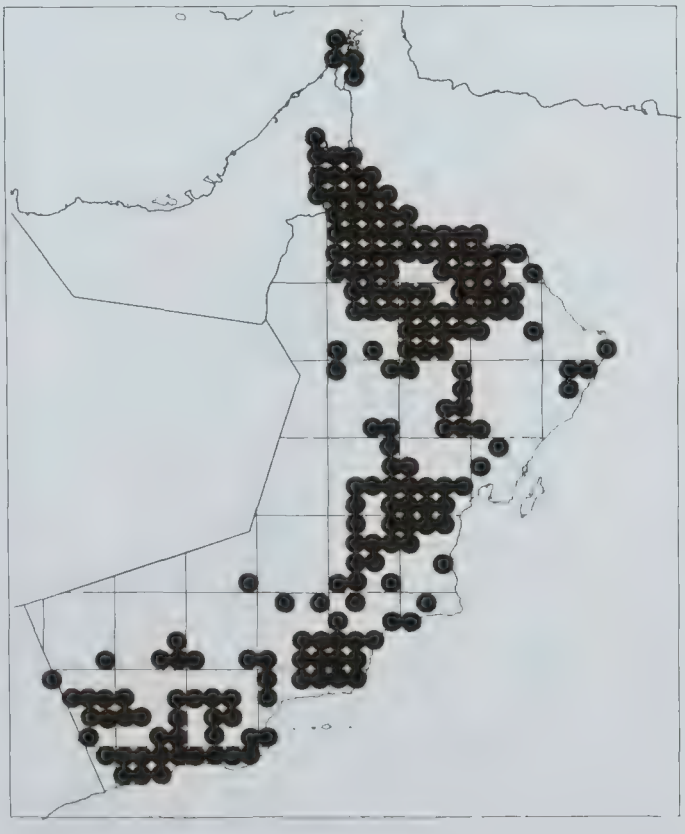


Fig. 310. Acacia tortilis.

Fig. 311. Acacia gerrardii subsp. gerarrdii.

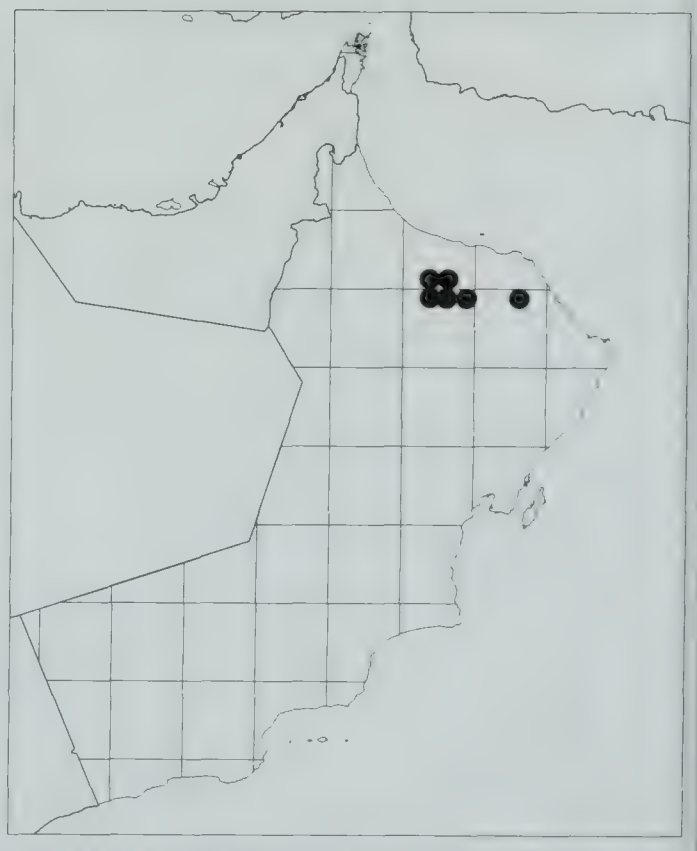


Fig. 312. Acacia gerrardii subsp. negevensis.

Fig. 313. Caesalpinia bonduc.

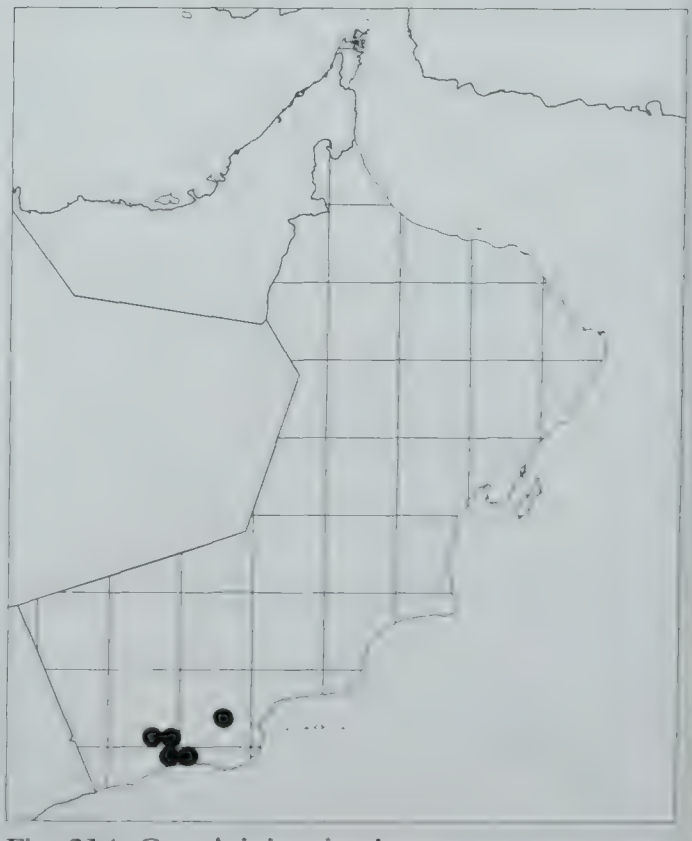


Fig. 314. Caesalpinia erianthera.

Fig. 315. Delonix elata.

Fig. 316. Senna obtusifolia.

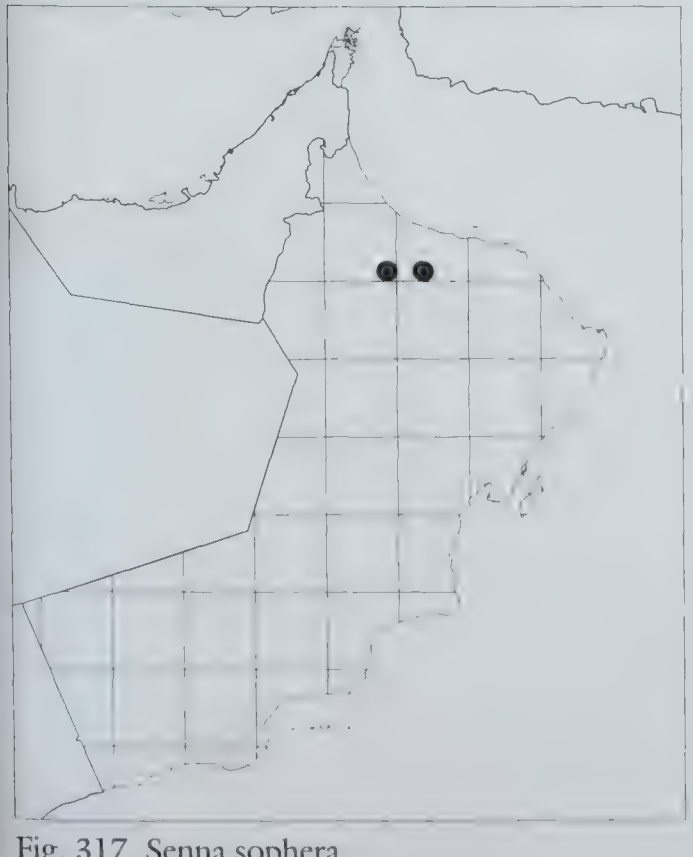


Fig. 317. Senna sophera.

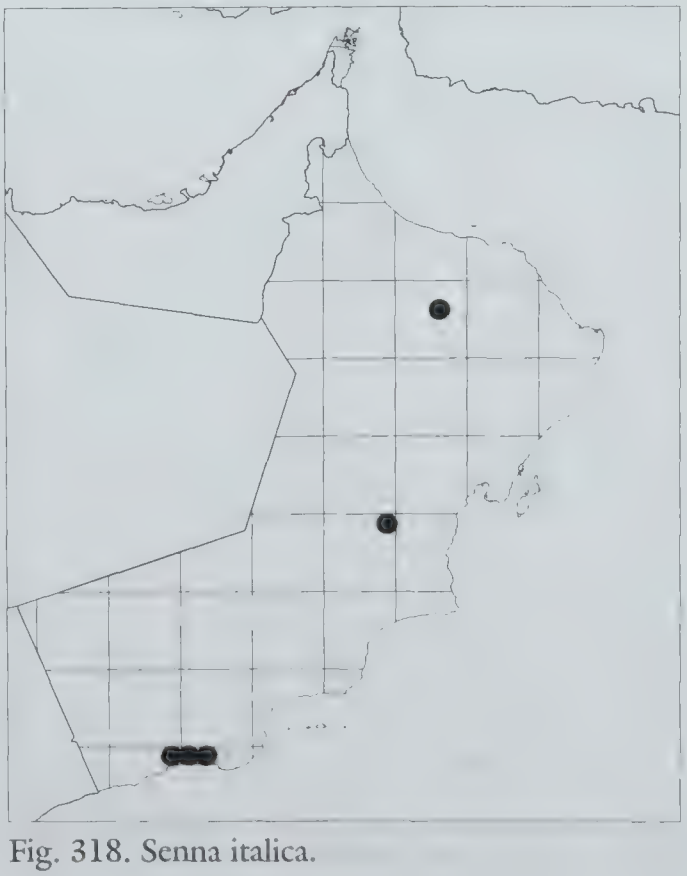


Fig. 318. Senna italica.

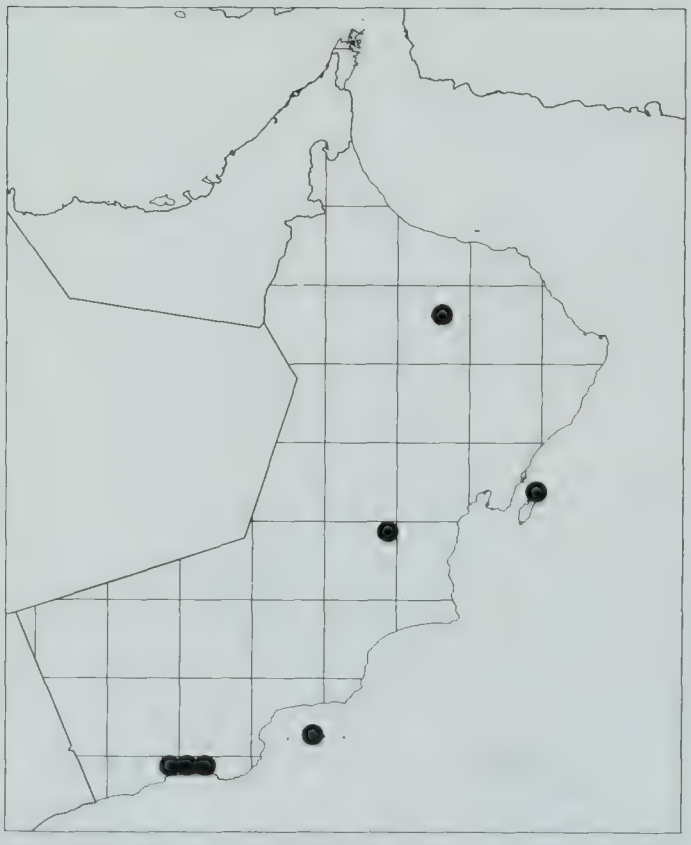


Fig. 319. Senna holosericea.

Fig. 320. Ceratonia oreothauma subsp. oreothauma

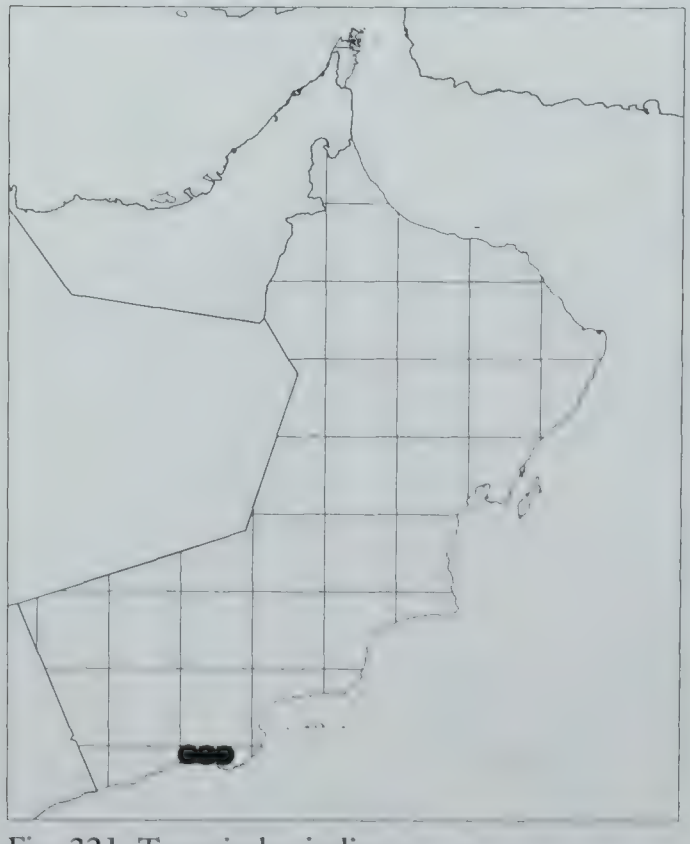


Fig. 321. Tamarindus indica.

Fig. 322. Cadia purpurea.

Fig. 323. Dalbergia sissoo.

Fig. 324. Tephrosia strigosa.

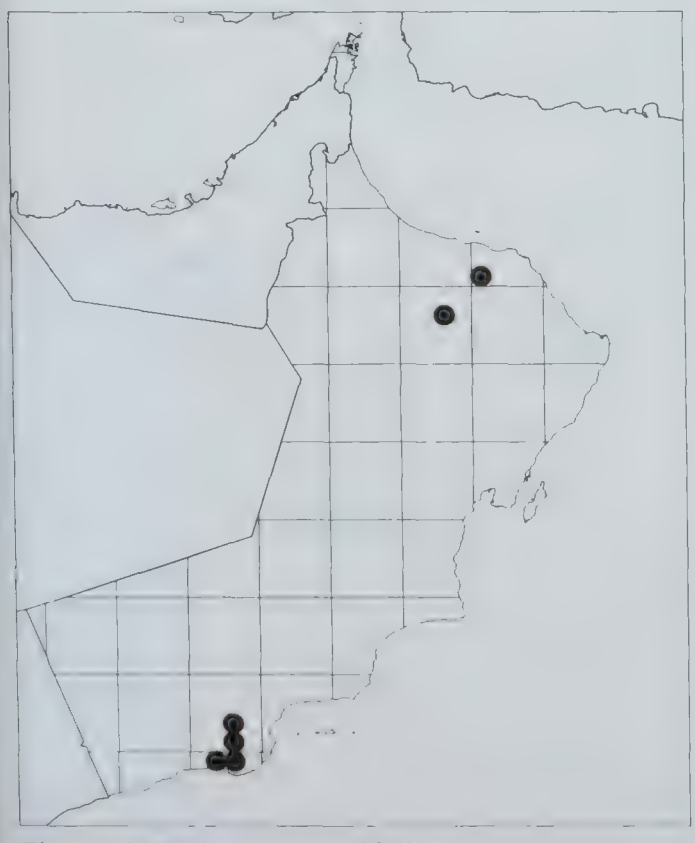


Fig. 325. Tephrosia subtrifolia.

Fig. 326. Tephrosia humilis.

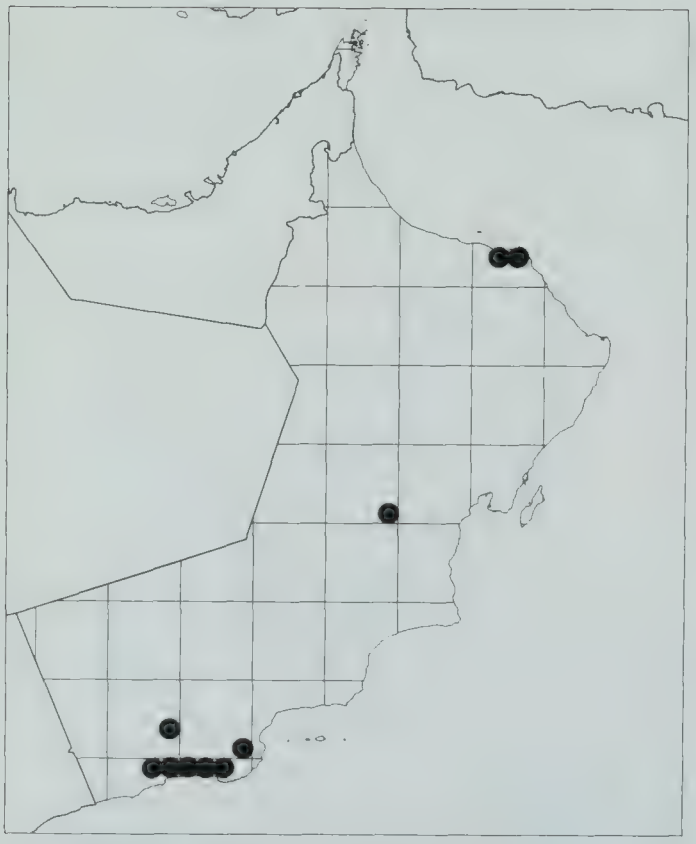


Fig. 327. Tephrosia quartiniana.

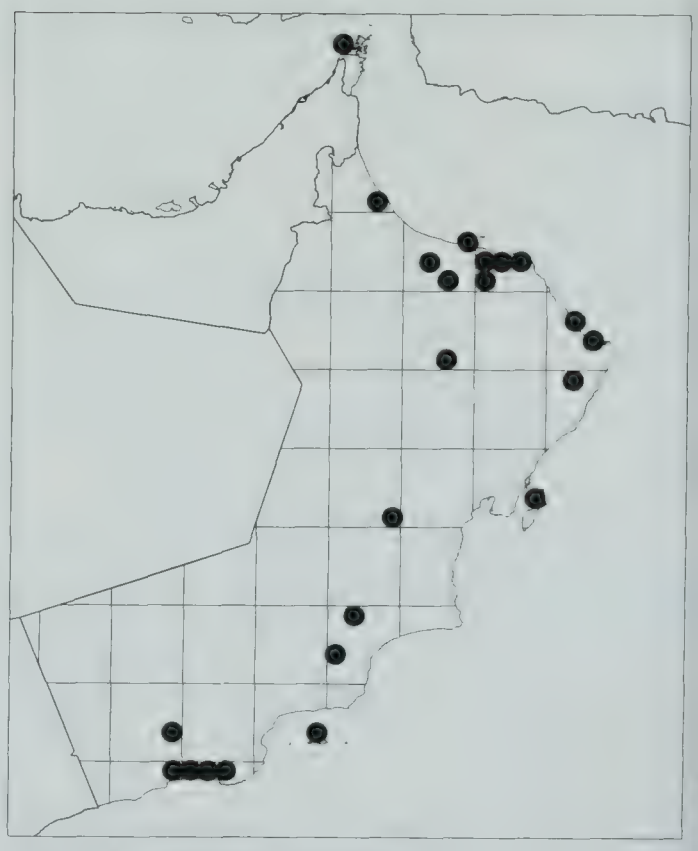


Fig. 328. Tephrosia purpurea subsp. leptostachya

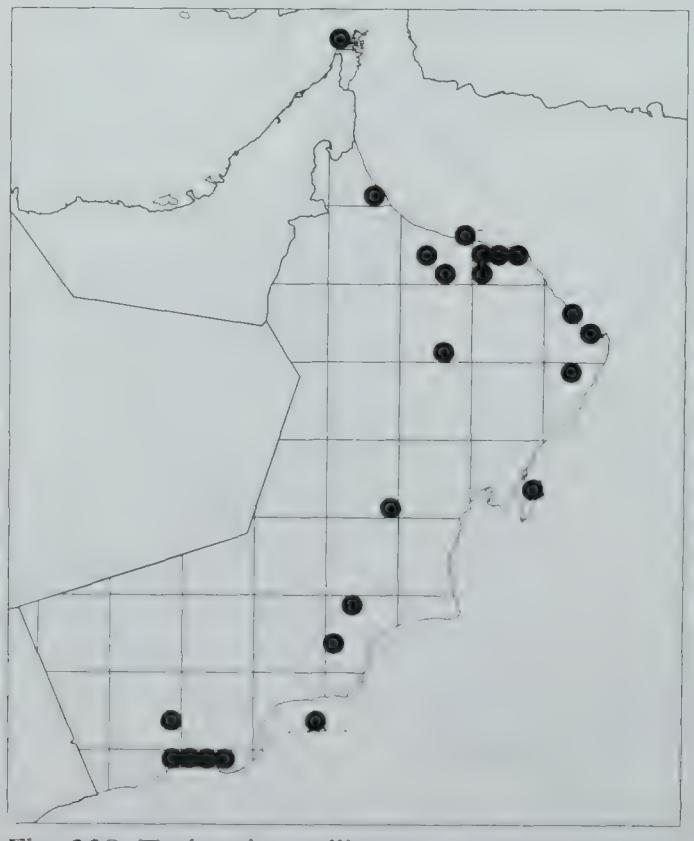


Fig. 329. Tephrosia apollinea.

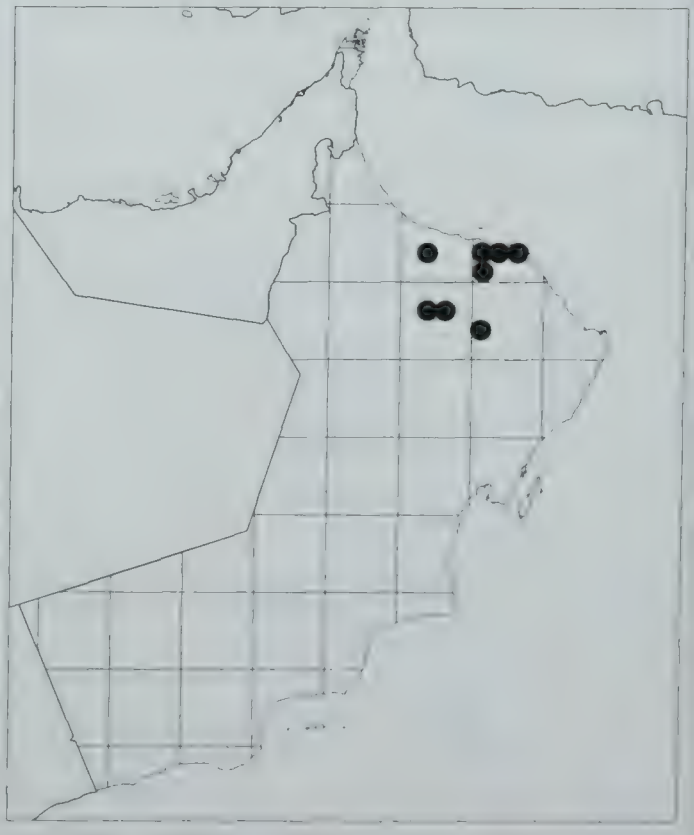


Fig. 330. Tephrosia nubica subsp. arabica.

Fig. 331. Indigofera arabica.

Fig. 332. Indigofera hochstetteri.

Fig. 333. Indigofera cordifolia.

Fig. 334. Indigofera colutea.

Fig. 335. Indigofera argentea.

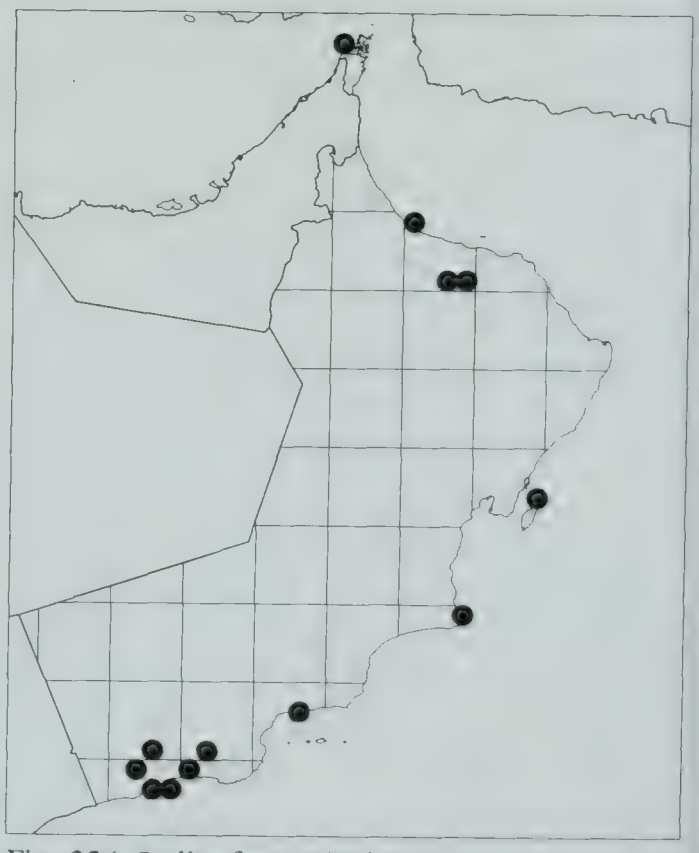


Fig. 336. Indigofera articulata.

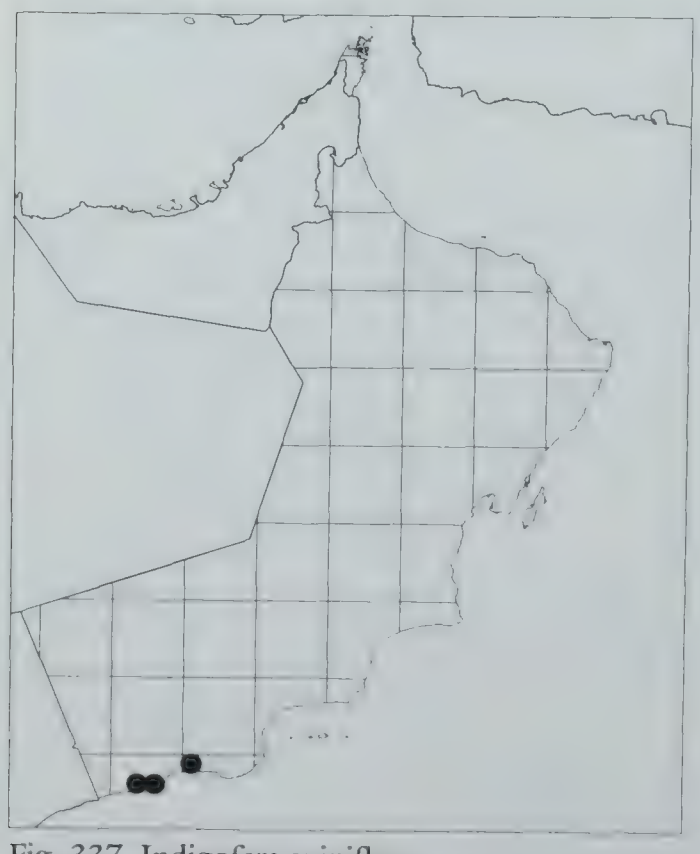


Fig. 337. Indigofera spiniflora.

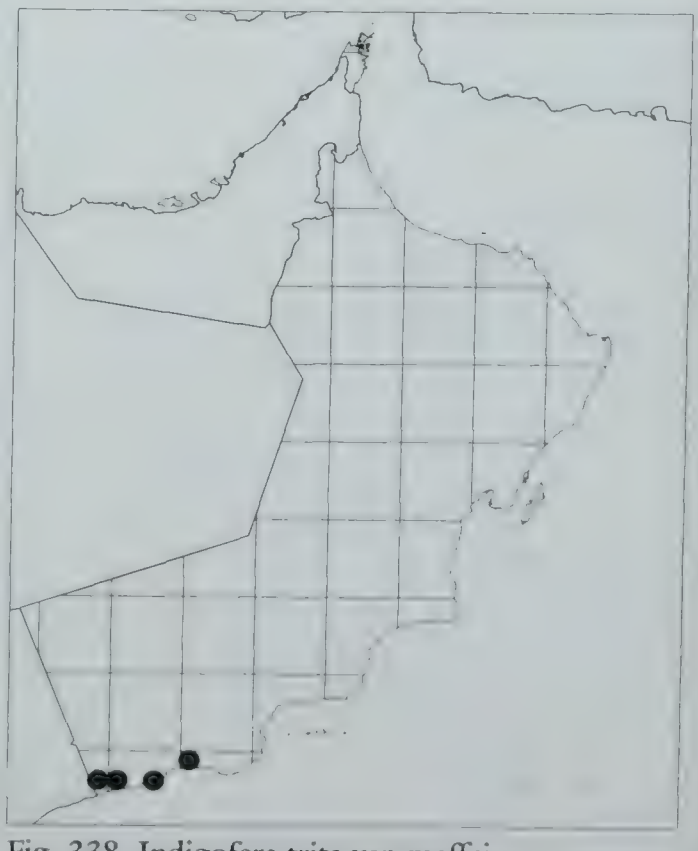


Fig. 338. Indigofera trita var. maffei

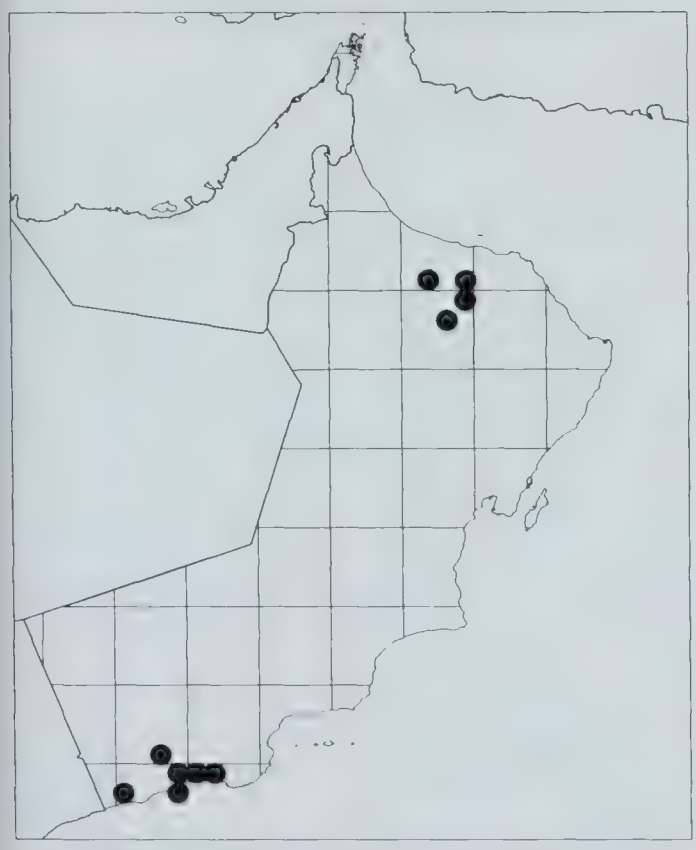


Fig. 339. Indigofera coerulea var. coerulea

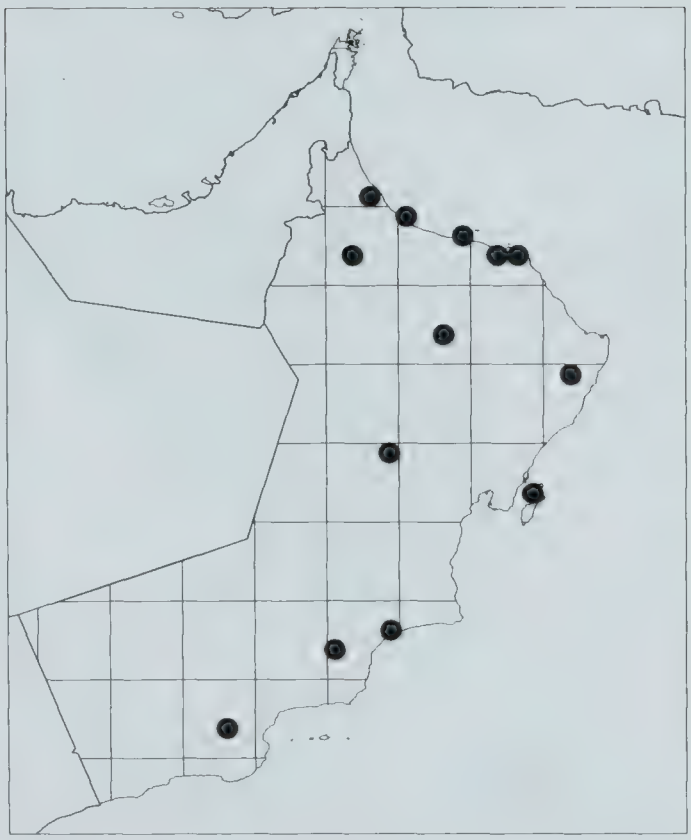


Fig. 340. Indigofera intricata.

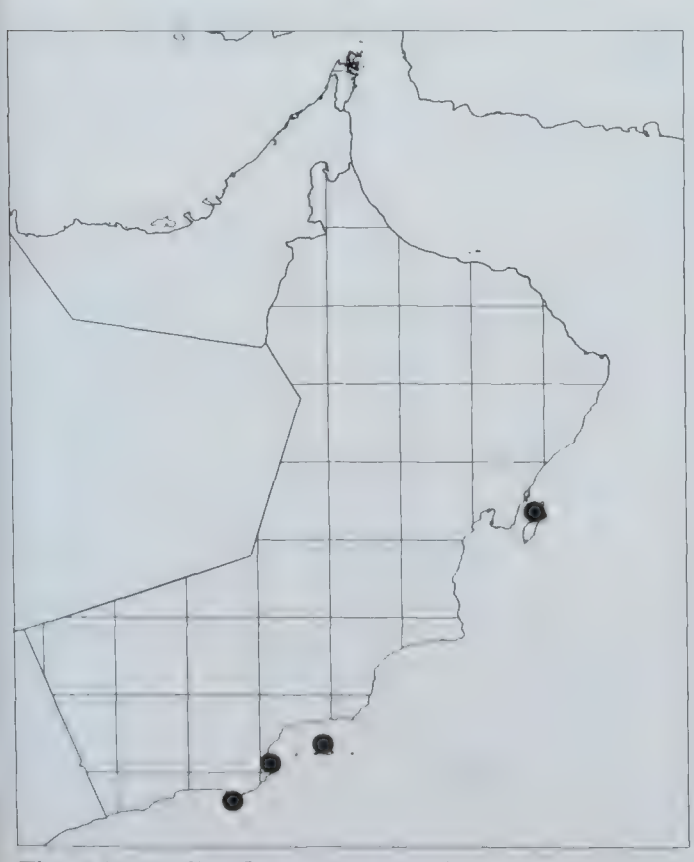


Fig. 341. Indigofera rubromarginata.

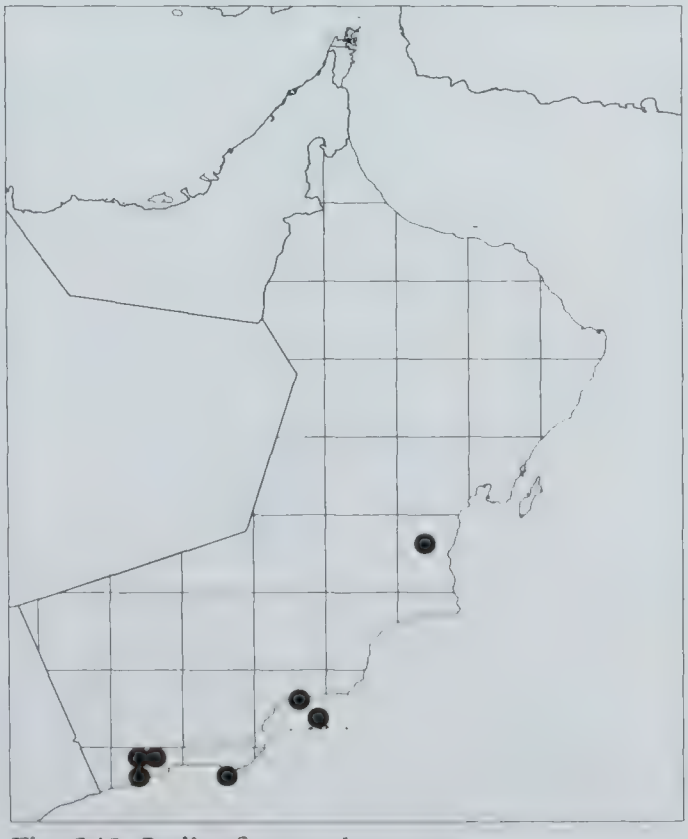


Fig. 342. Indigofera nephrocarpa.

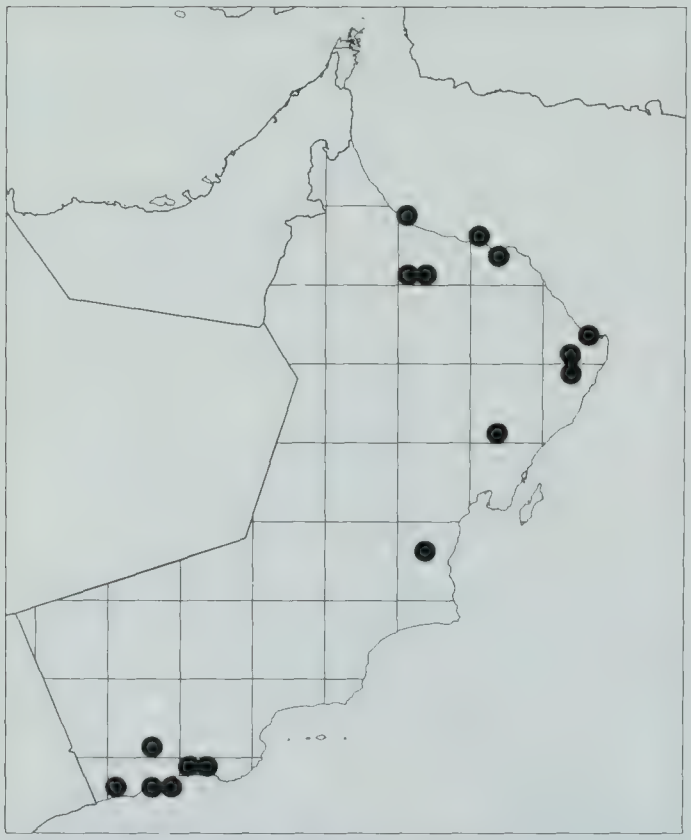


Fig. 343. Indigofera oblongifolia.

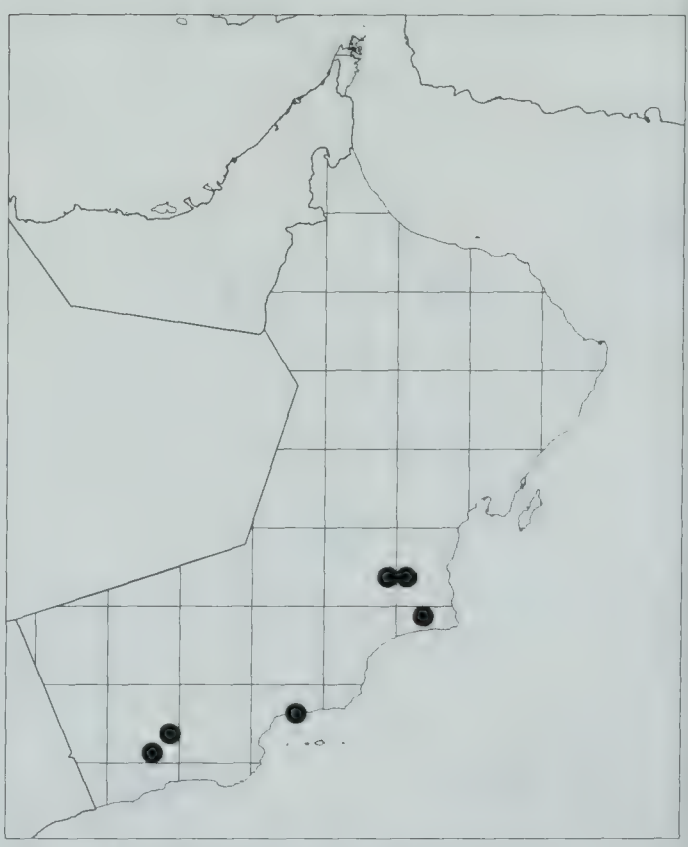


Fig. 344. Indigofera semitrijuga.

Fig. 345. Indigofera volkensii.

Fig. 346. Sesbania sesban.

Fig. 347. Sesbania bispinosa.

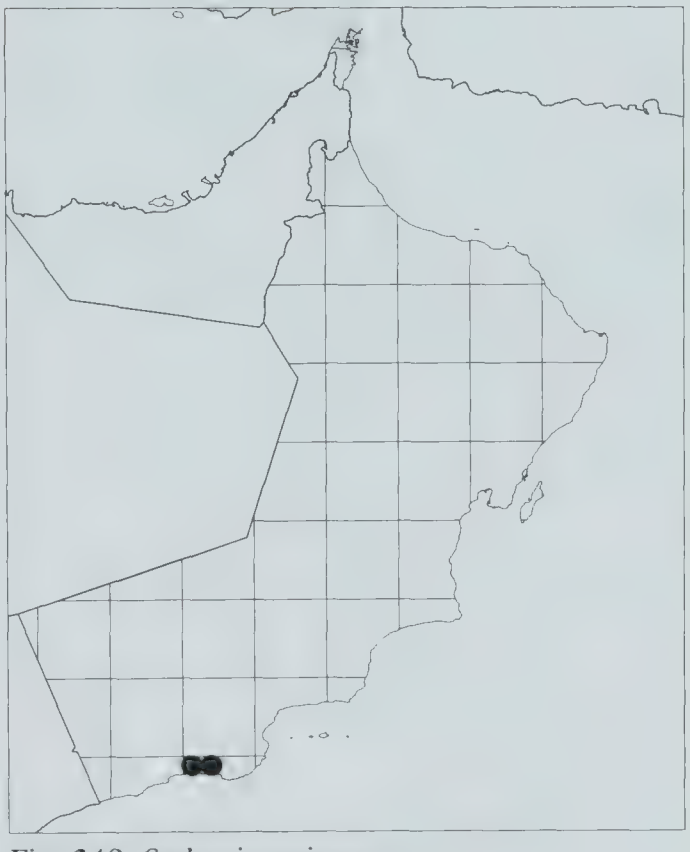


Fig. 348. Sesbania sericea.

Fig. 349. Ormocarpum dhofarense.

Fig. 350. Alhagi graecorum.

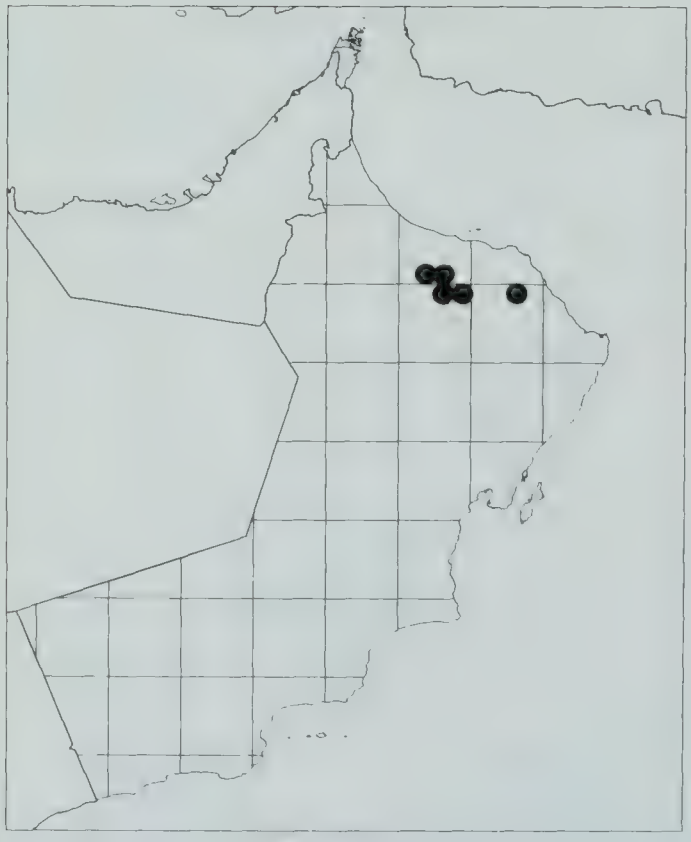


Fig. 351. Ebenus stellata.

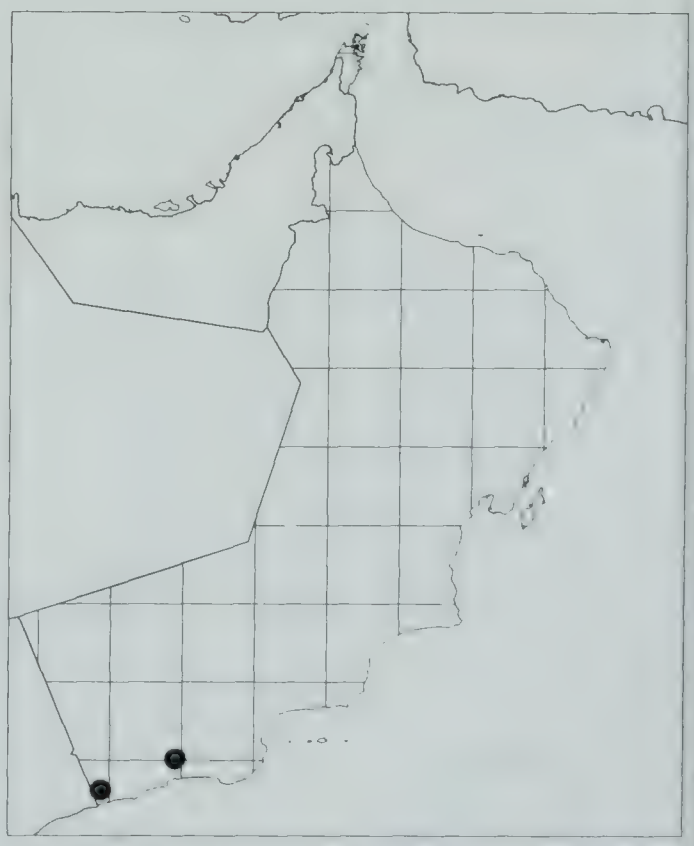


Fig. 352. Desmodium ospriostreblum.

Fig. 353. Desmodium dichotomum.

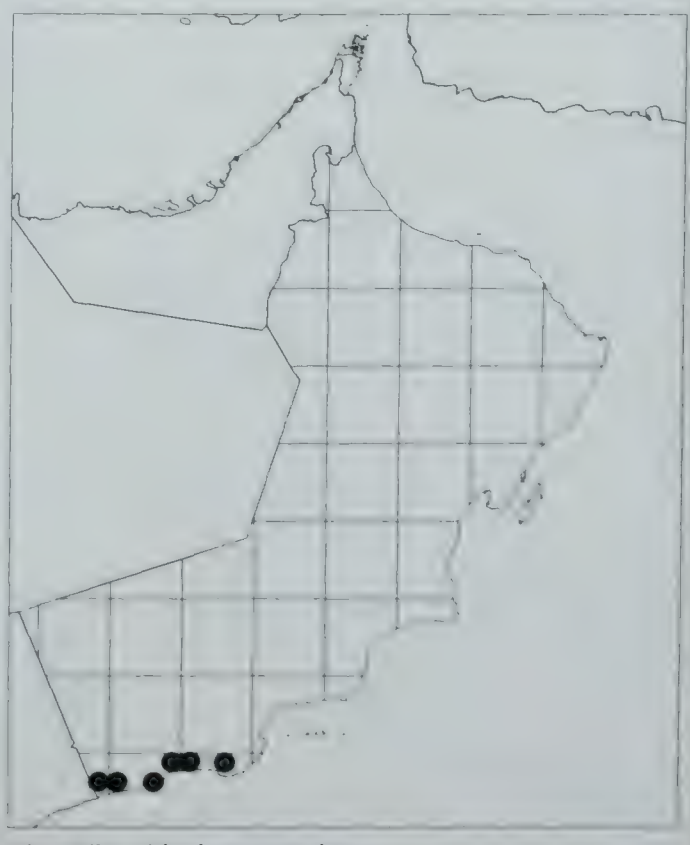


Fig. 354. Alysicarpus glumaceus.

Fig. 355. Alysicarpus rugosus.

Fig. 356. Alysicarpus vaginalis.

Fig. 357. Alysicarpus longifolius.

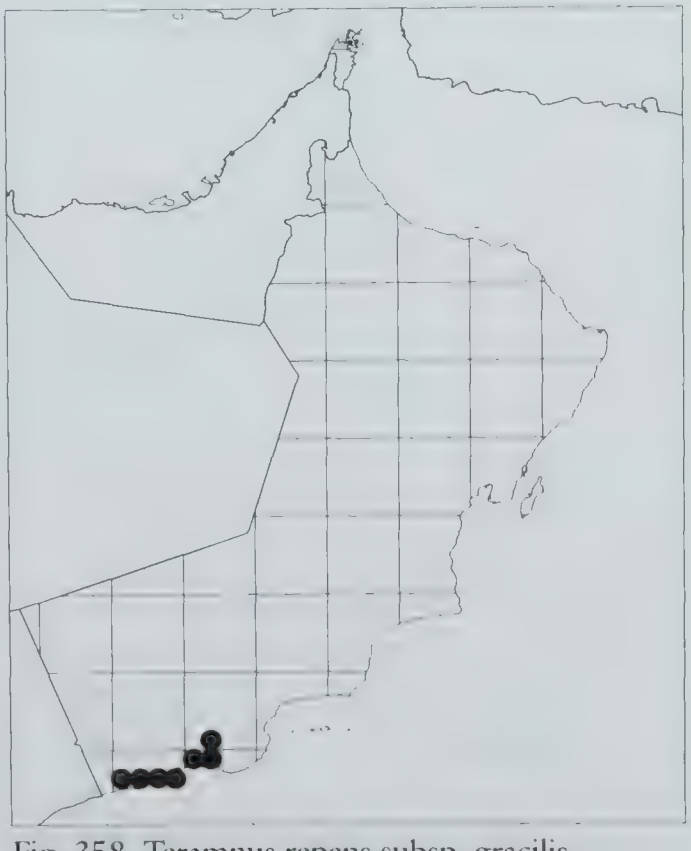


Fig. 358. Teramnus repens subsp. gracilis.

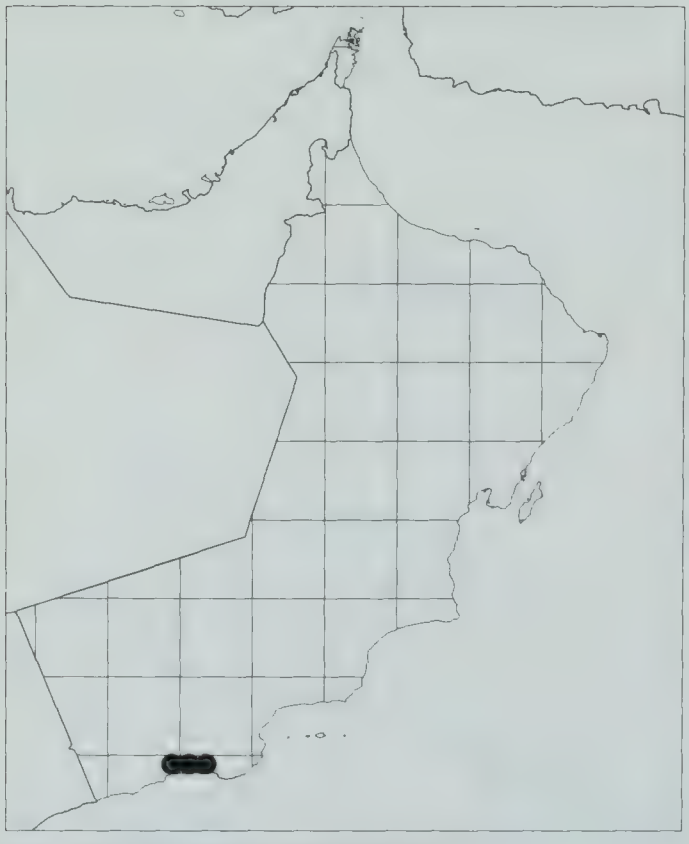


Fig. 359. Vatovaea pseudolablab.

Fig. 360. Vigna radiata subsp. sublobata.

Fig. 361. Rhynchosia schimperi.

Fig. 362. Rhynchosia pulverulenta.

Fig. 363. Rhynchosia minima.

Fig. 364. Ononis viscosa subsp. sicula.

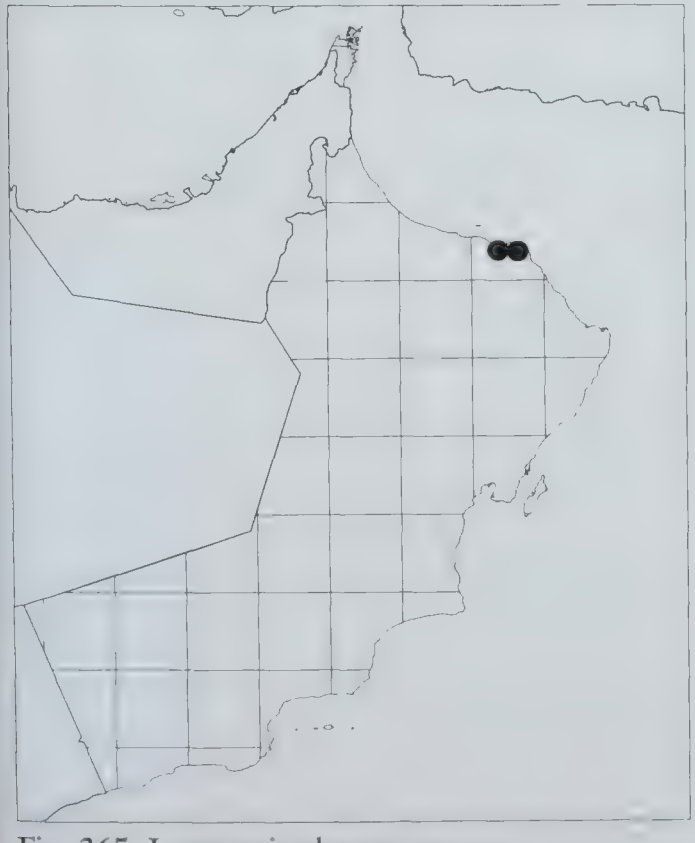


Fig. 365. Lotononis platycarpos.

Fig. 366. Crotalaria medicaginea.

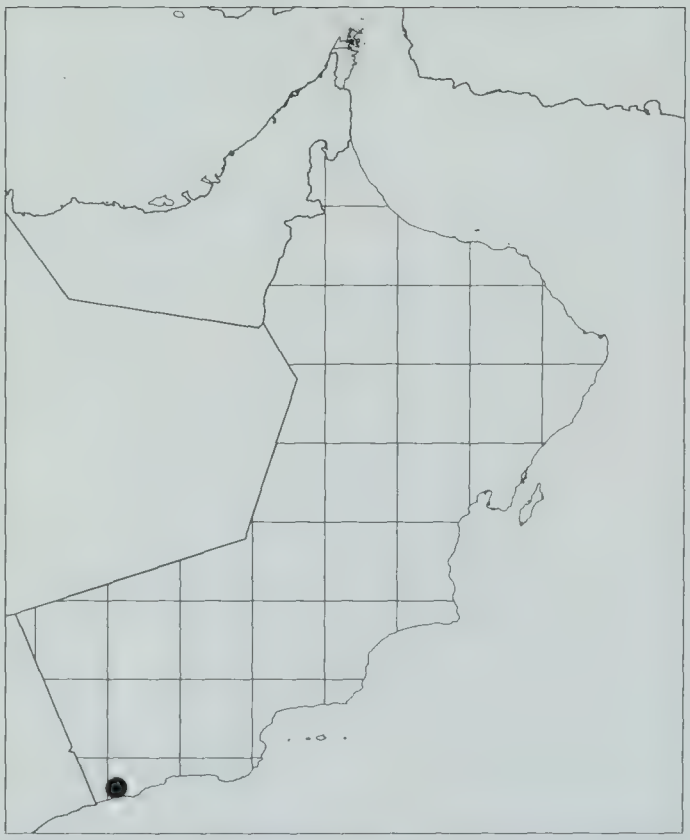


Fig. 367. Crotalaria saltiana.

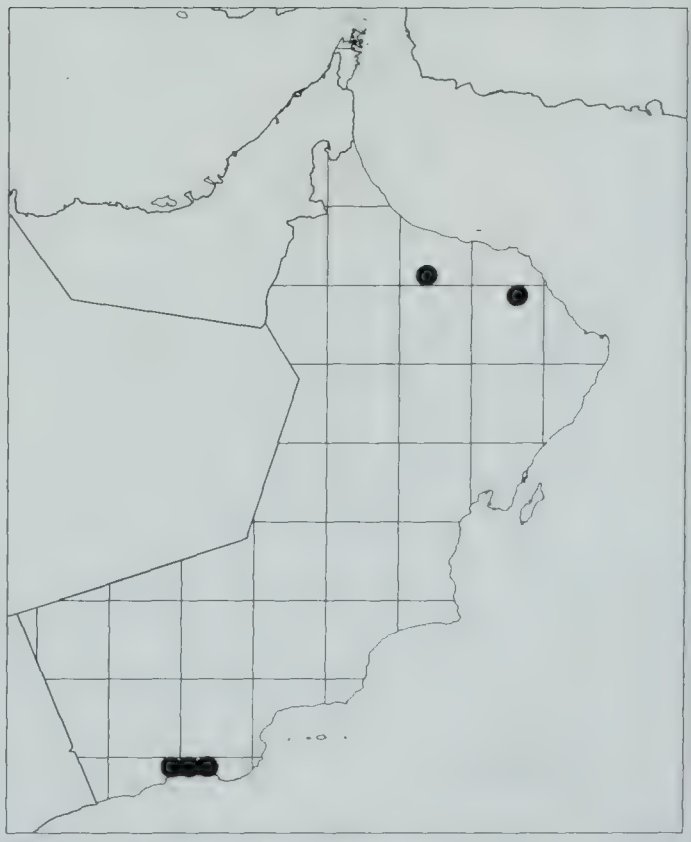


Fig. 368. Crotalaria retusa.

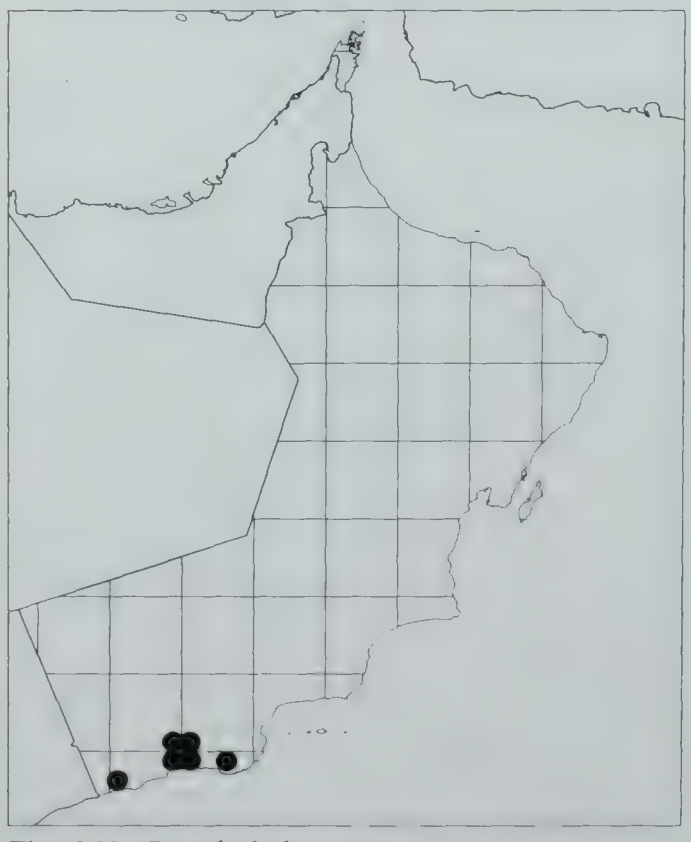


Fig. 369. Crotalaria leptocarpa.

Fig. 370. Crotalaria pteropoda.

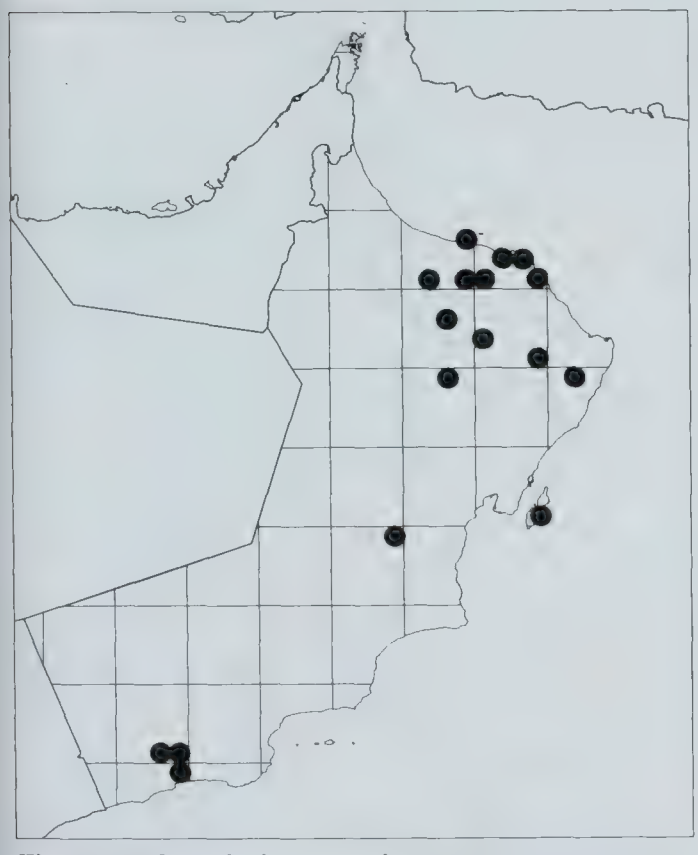


Fig. 371. Crotalaria aegyptiaca.

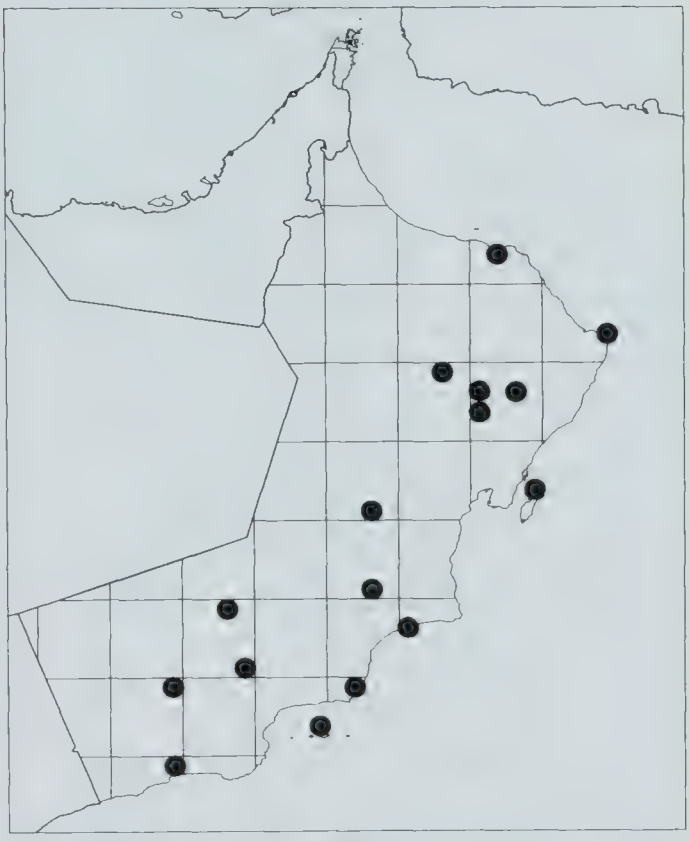


Fig. 372. Crotalaria persica.

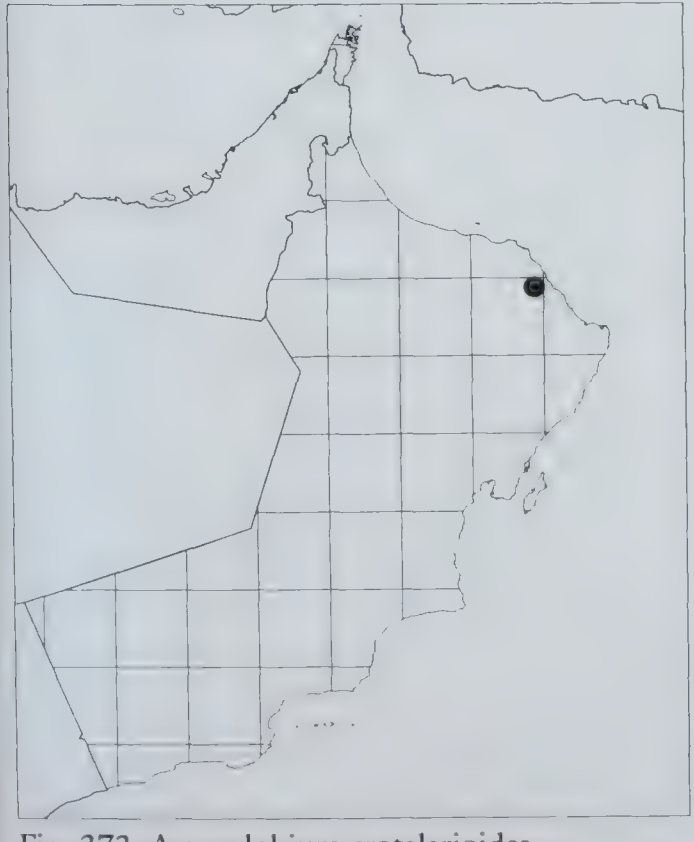


Fig. 373. Argyrolobium crotalarioides.

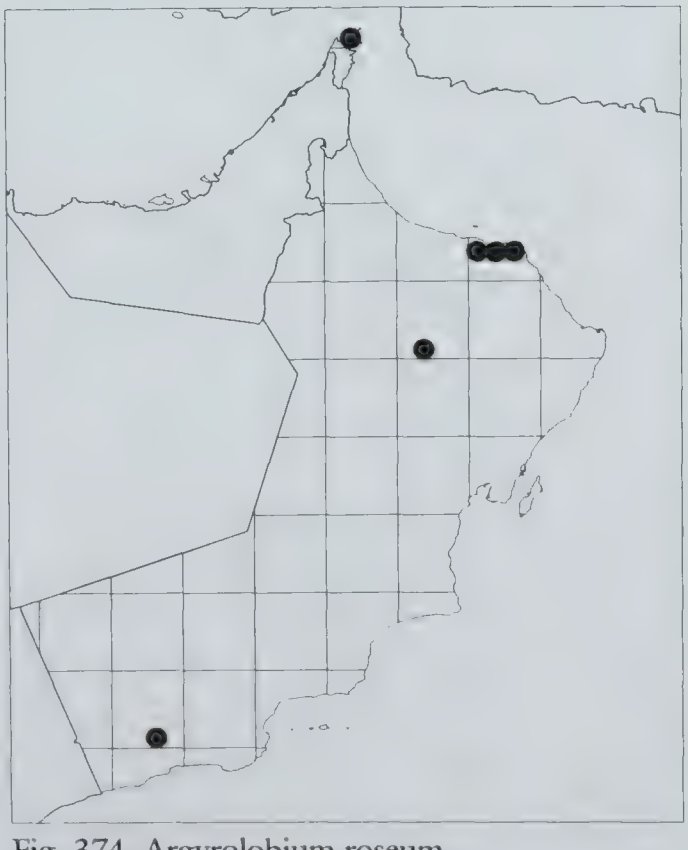


Fig. 374. Argyrolobium roseum.

Fig. 375. Psoralea corylifolia.

Fig. 376. Psoralea plicata.

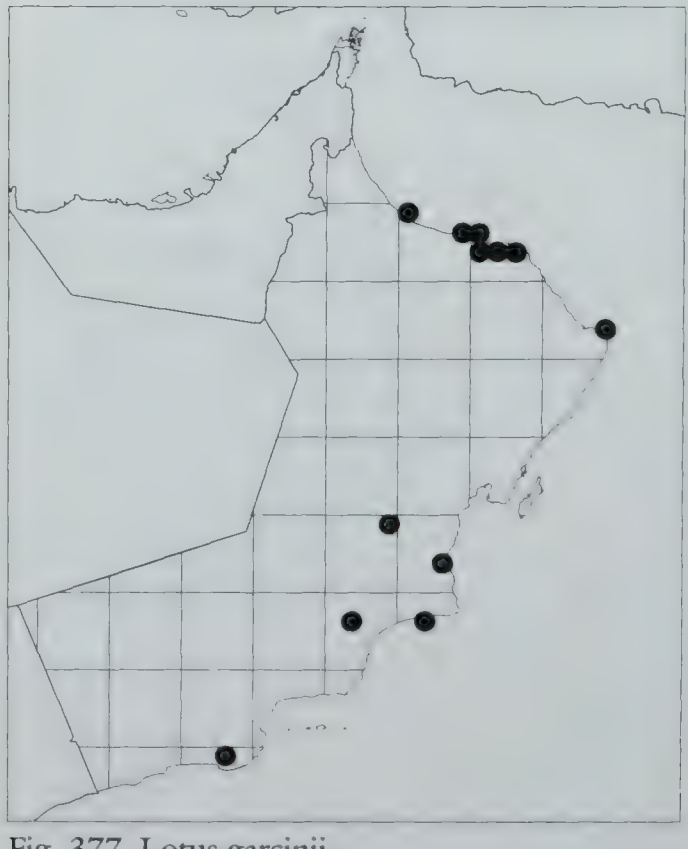


Fig. 377. Lotus garcinii.

Fig. 378. Lotus schimperi.

Fig. 379. Lotus laricus.

Fig. 380. Lotus halophilus.

Fig. 381. Pseudolotus makranicus.

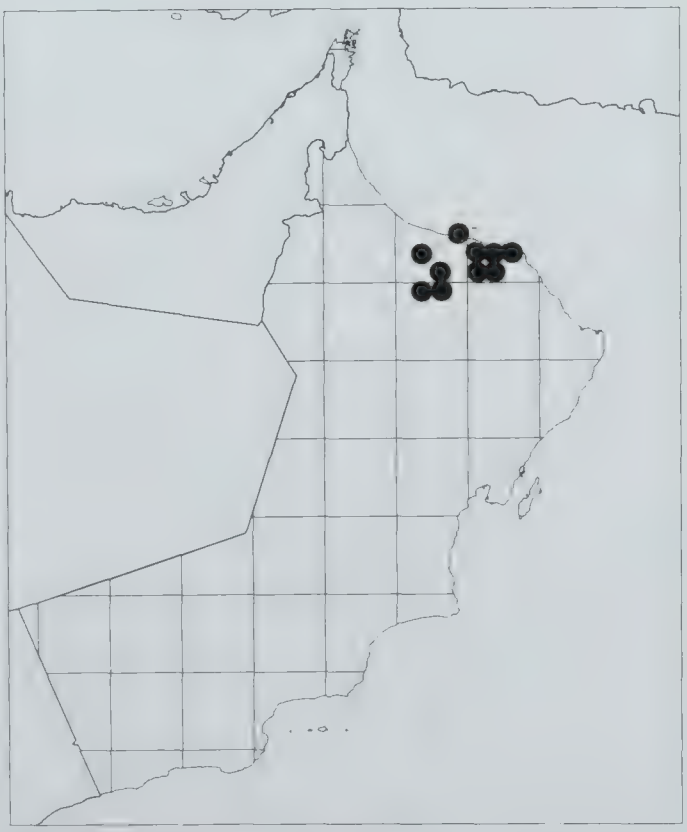


Fig. 382. Taverniera cuneifolia.

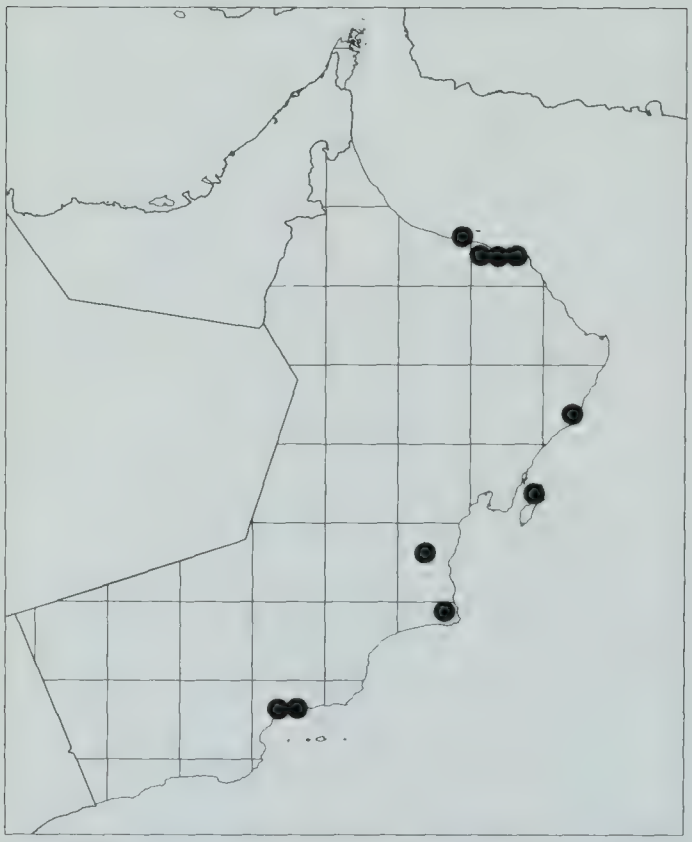


Fig. 383. Taverniera spartea.

Fig. 384. Taverniera brevialata.

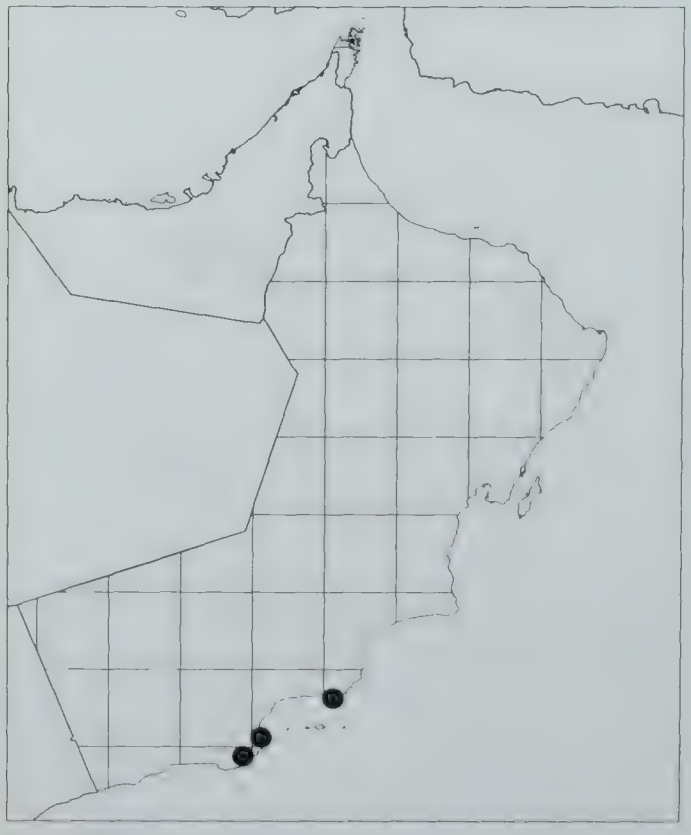


Fig. 385. Taverniera multinoda.

Fig. 386. Taverniera lappacea.

Fig. 387. Astragalus arpilobus subsp. hauarensis.

Fig. 388. Astragalus crenatus.

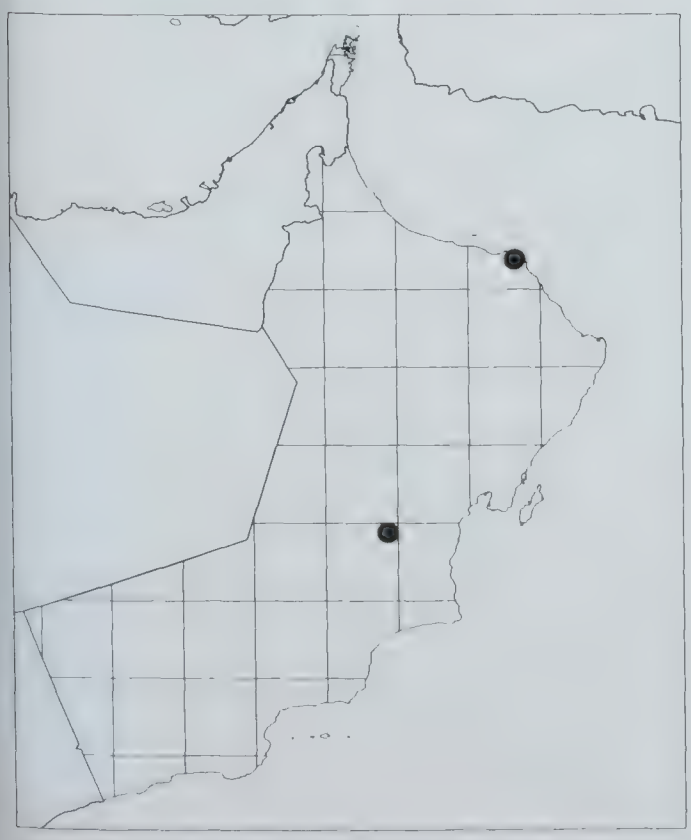


Fig. 389. Astragalus eremophilus.

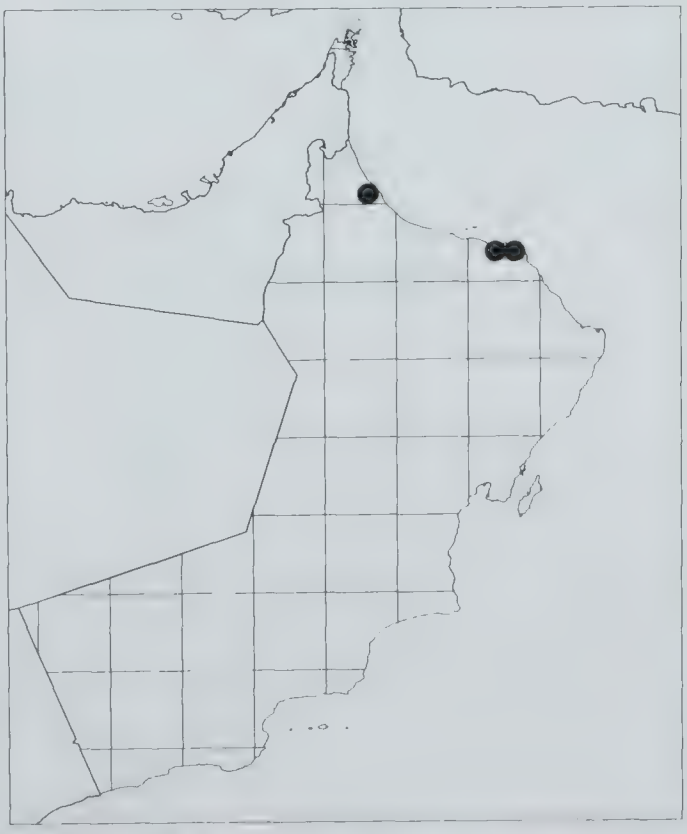


Fig. 390. Astragalus vogelii subsp. fatimensis.

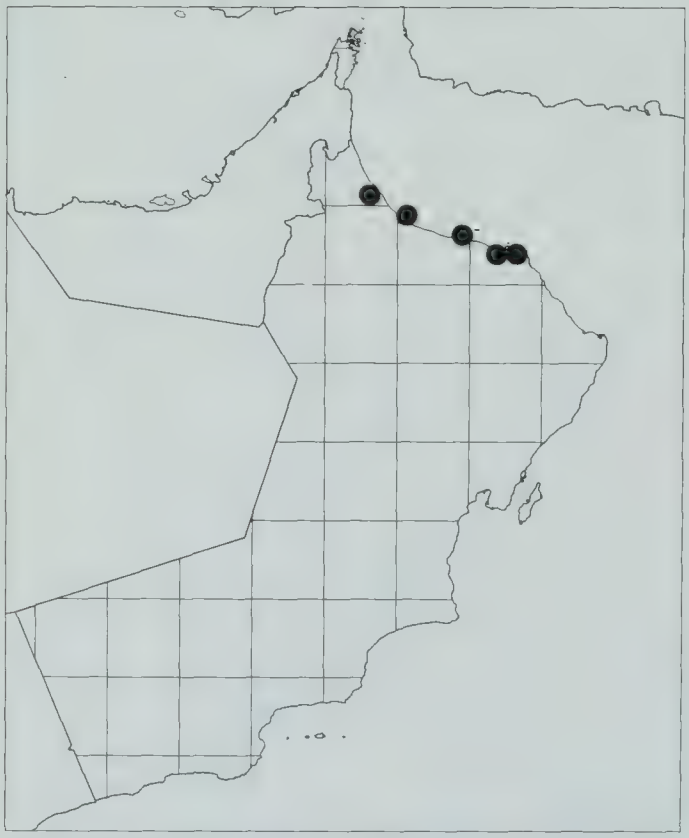


Fig. 391. Astragalus schimperi.

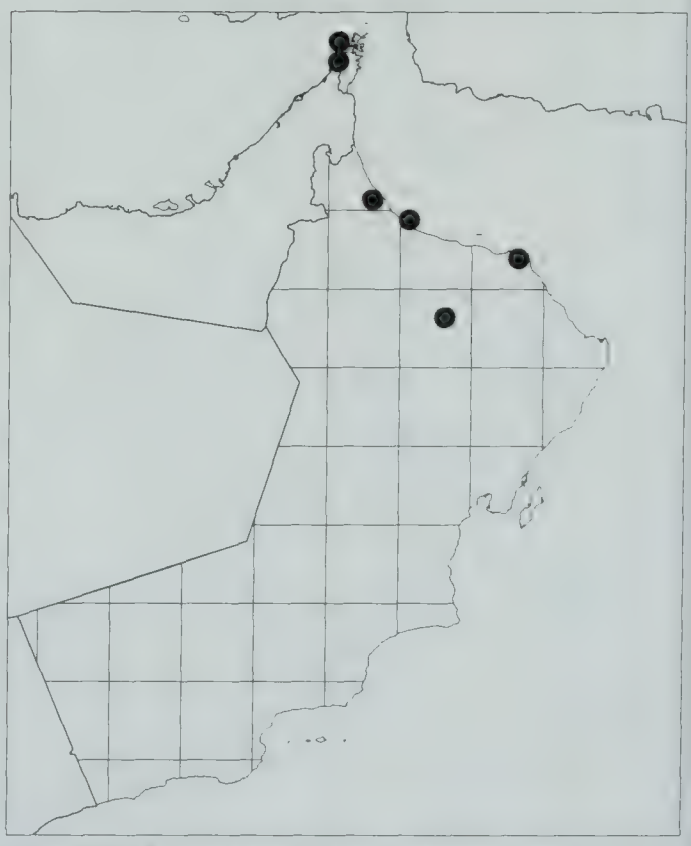


Fig. 392. Astragalus tribuloides.

Fig. 393. Astragalus termeanus.

Fig. 394. Astragalus fasciculifolius subsp. arbusculinus.

Fig. 395. Podolotus hosackioides.

Fig. 396. Medicago laciniata var. brachycantha.

Fig. 397. Medicago sativa.

Fig. 398. Medicago polymorpha.

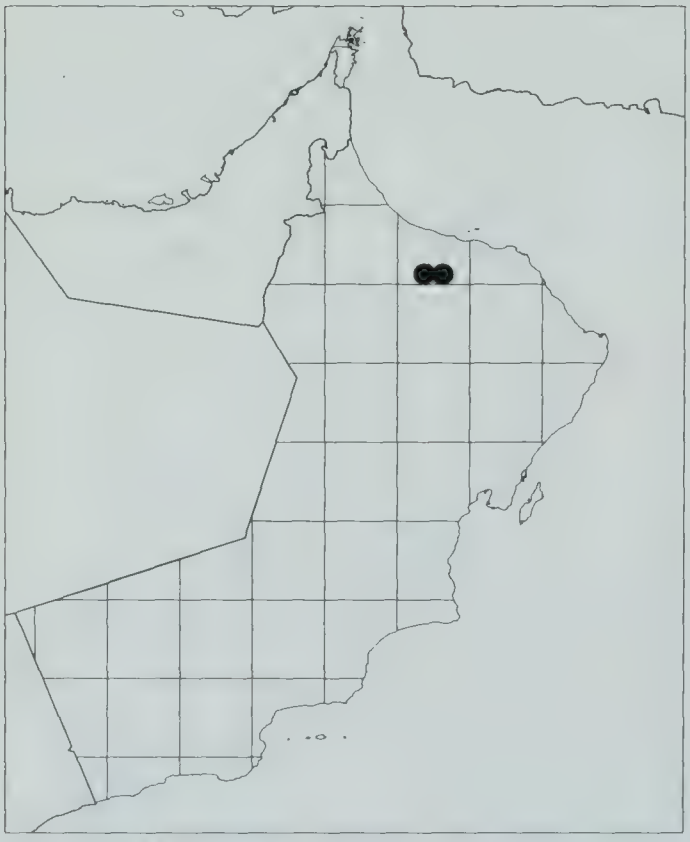


Fig. 399. Melilotus alba.

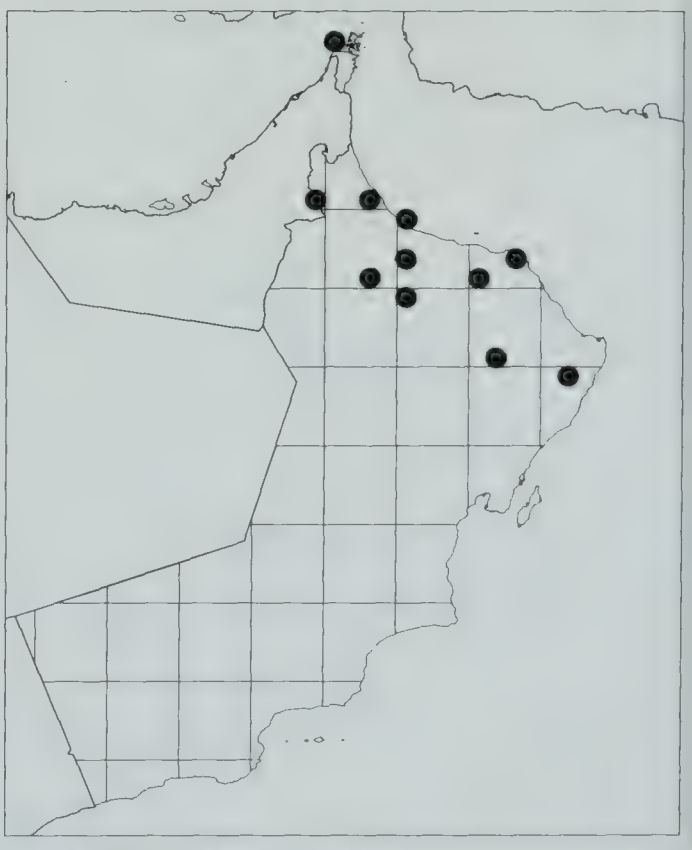


Fig. 400. Melilotus indica.

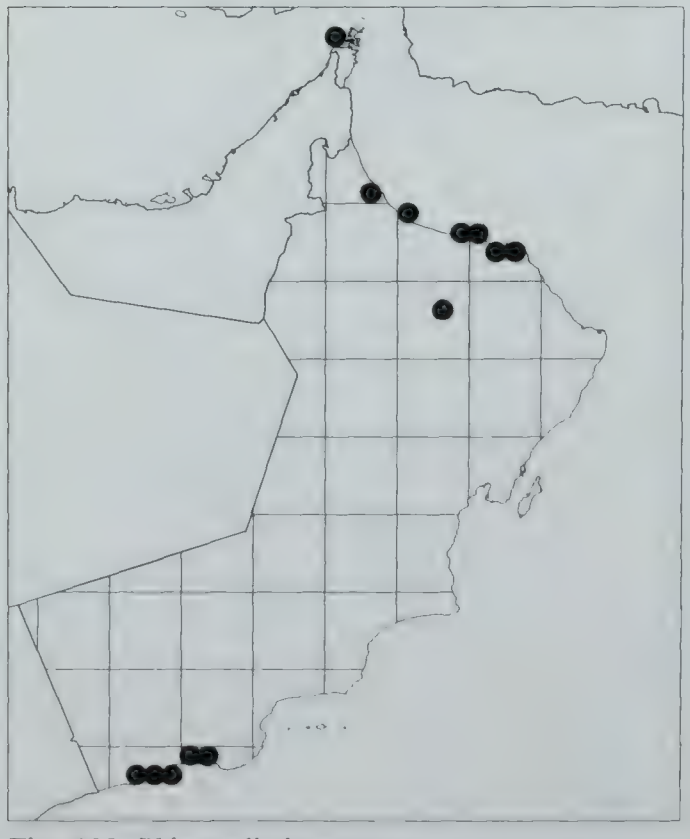


Fig. 401. Trigonella hamosa.

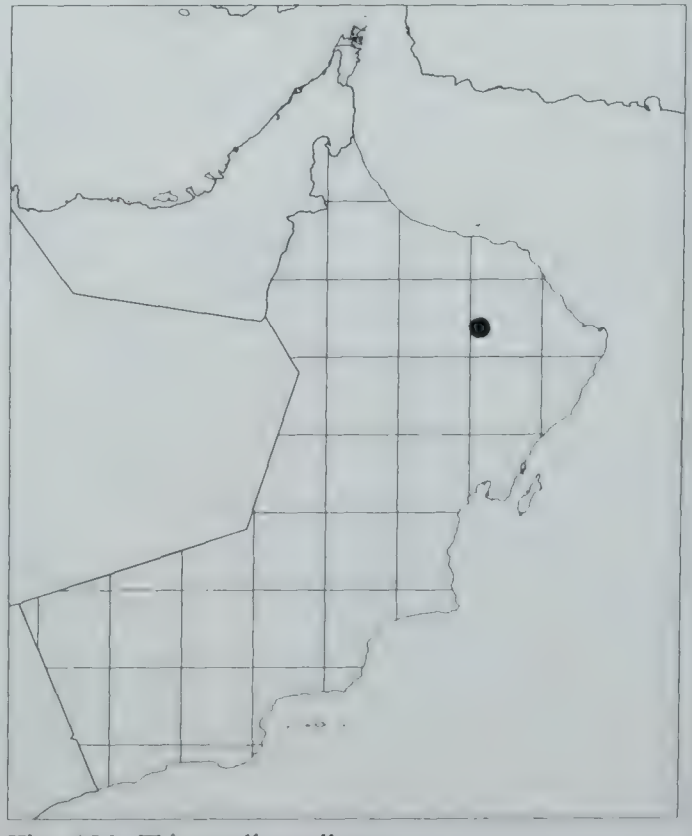


Fig. 402. Trigonella stellata.

Fig. 403. Hippocrepis constricta.

Fig. 404. Hippocrepis unisiliqua subsp. bisiliqua

Fig. 405. Vicia sativa.

Fig. 406. Woodfordia uniflora.

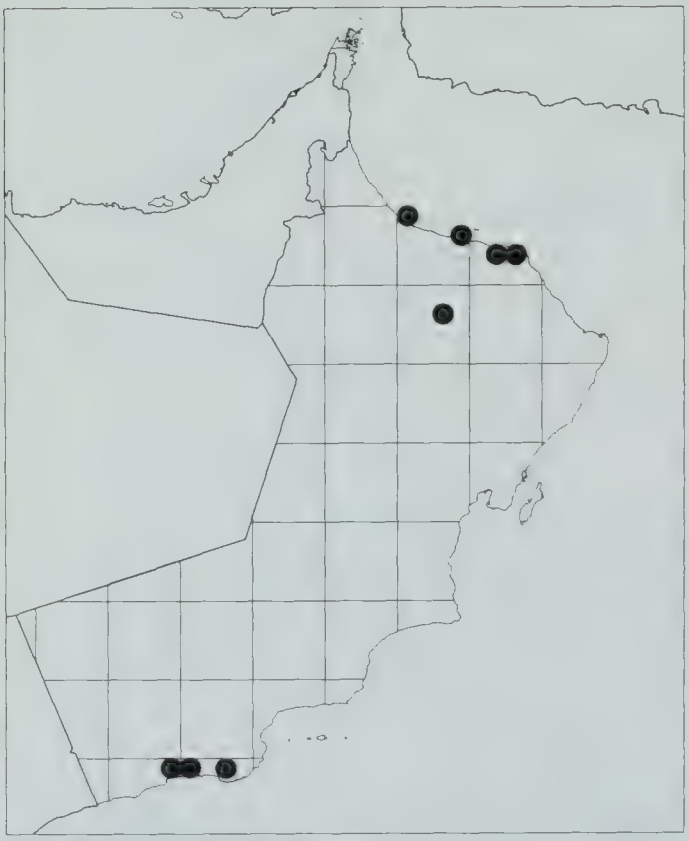


Fig. 407. Lawsonia inermis.

Fig. 408. Ammannia auriculata.

Fig. 409. Ammannia baccifera.

Fig. 410. Thymelaea mesopotamica.

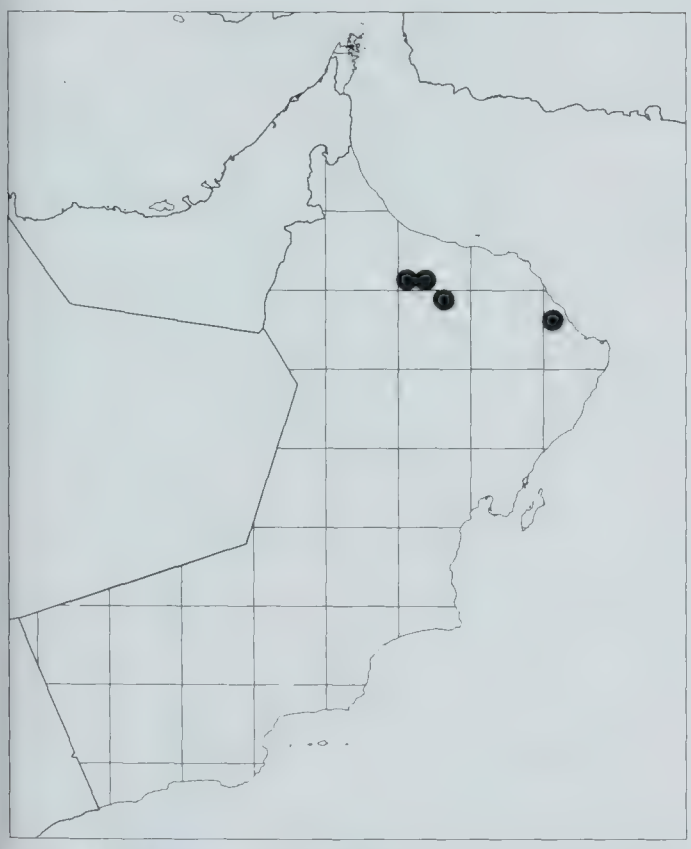


Fig. 411. Daphne mucronata.

Fig. 412. Gnidia somalensis.

Fig. 413. Myrtus communis.

Fig. 414. Anogeissus dhofarica.

Fig. 415. Osyris sp.

Fig. 416. Plicosepalus acaciae.

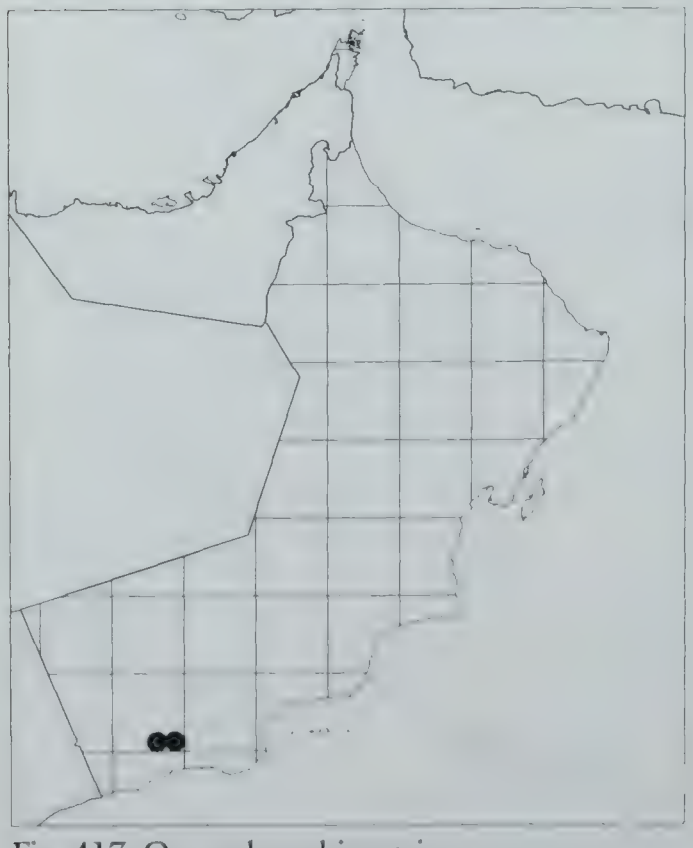


Fig. 417. Oncocalyx schimperi.

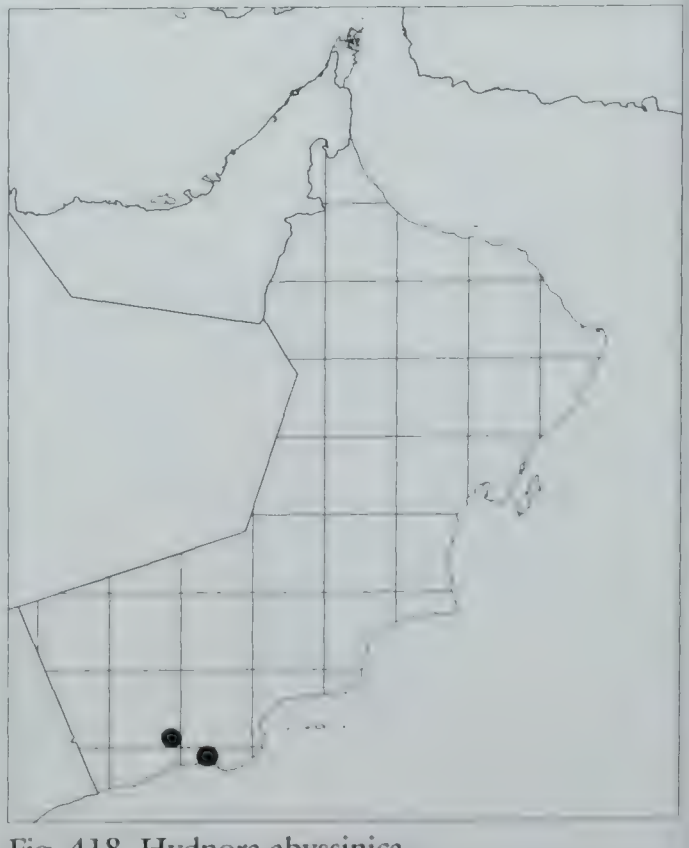


Fig. 418. Hydnora abyssinica.

Fig. 419. Maytenus senegalensis.

Fig. 420. Maytenus dhofarensis.

Fig. 421. Azima tetracantha.

Fig. 422. Salvadora persica.

Fig. 423. Flueggea virosa.

Fig. 424. Phyllanthus fraternus.

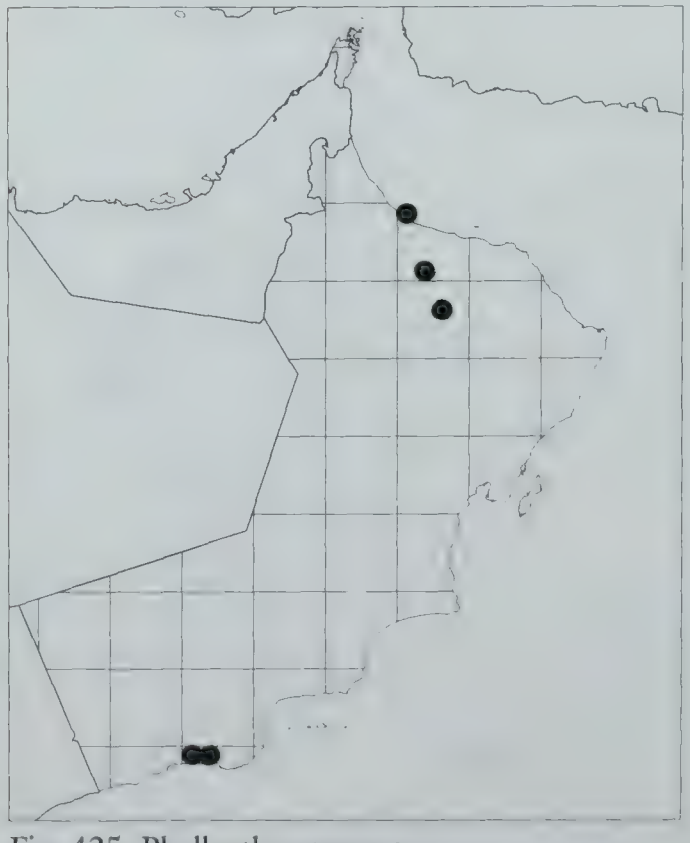


Fig. 425. Phyllanthus amarus.

Fig. 426. Phyllanthus rotundifolius.

Fig. 427. Phyllanthus maderaspatensis.

Fig. 428. Meineckia phyllanthoides.

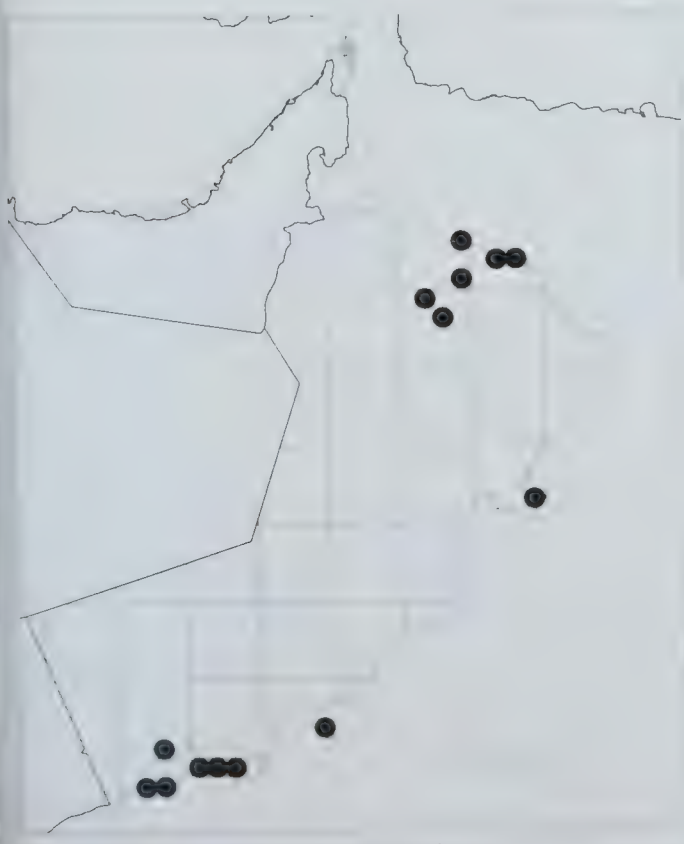


Fig. 429. Andrachne telephioides.

Fig. 430. Andrachne aspera.

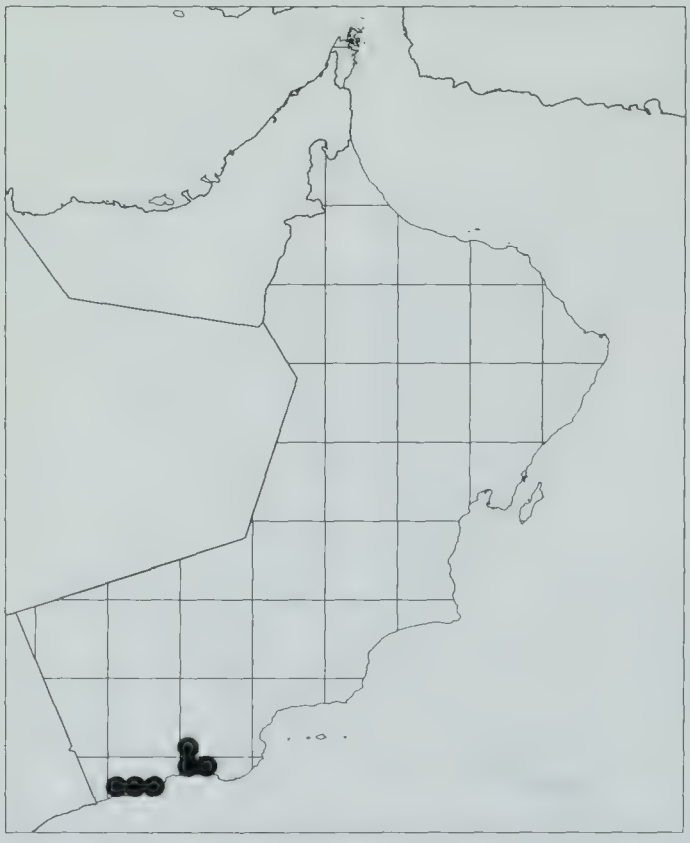


Fig. 431. Croton confertus.

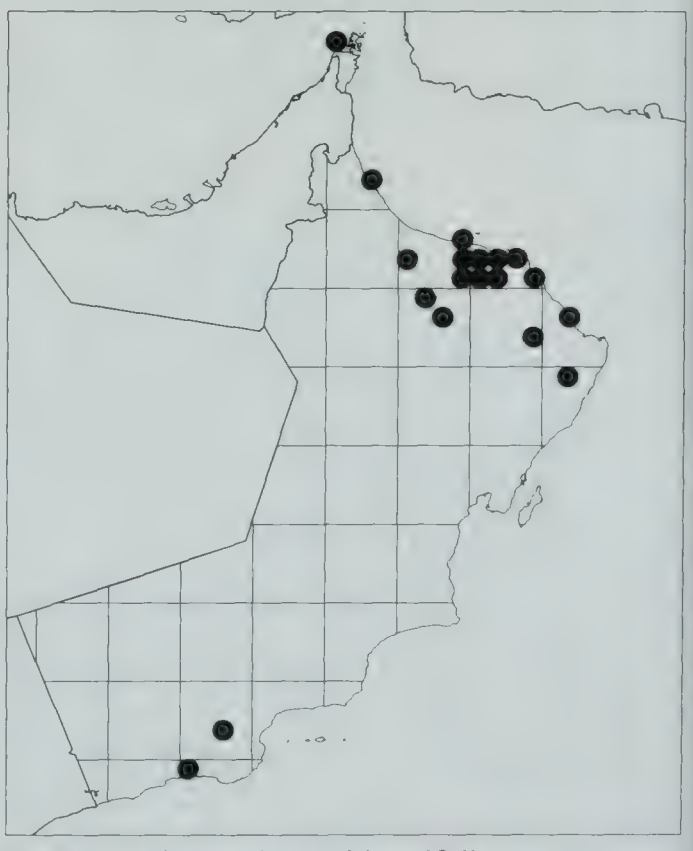


Fig. 432. Chrozophora oblongifolia.

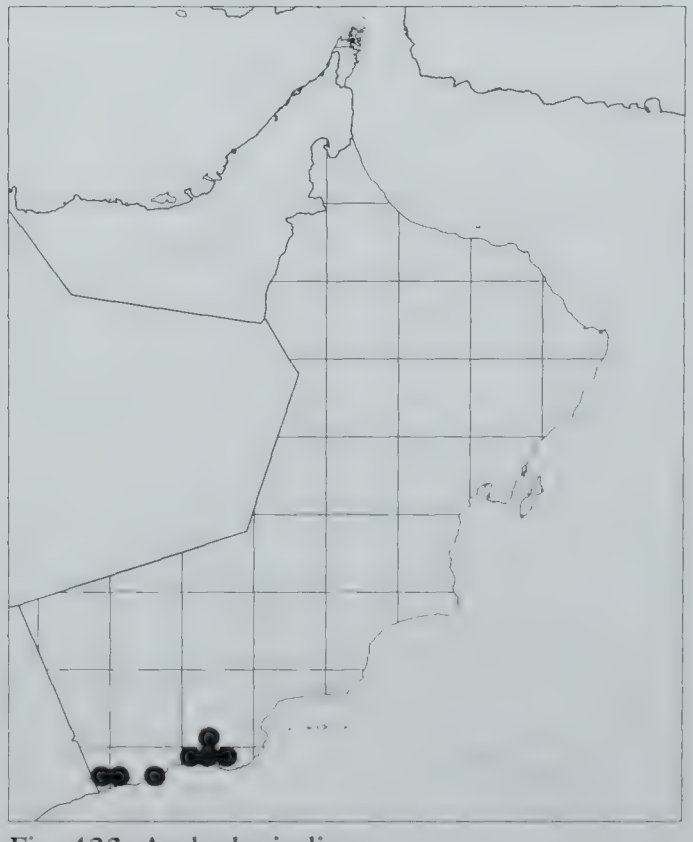


Fig. 433. Acalypha indica.

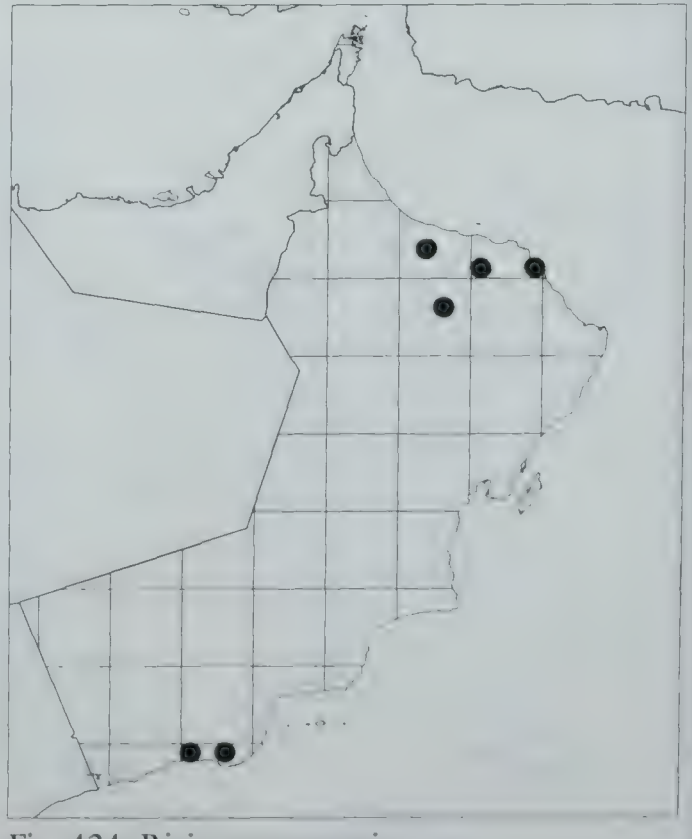


Fig. 434. Ricinus communis.

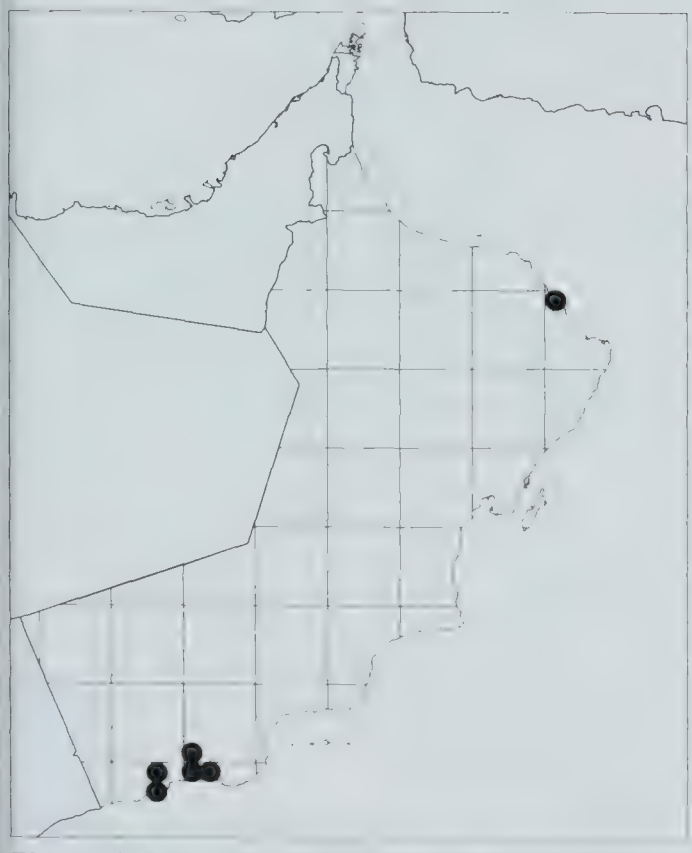


Fig. 435. Dalechampia scandens var. cordofana.

Fig. 436.Jatropha glandulosa.

Fig. 437. Jatropha dhofarica.

Fig. 438. Euphorbia hirta.

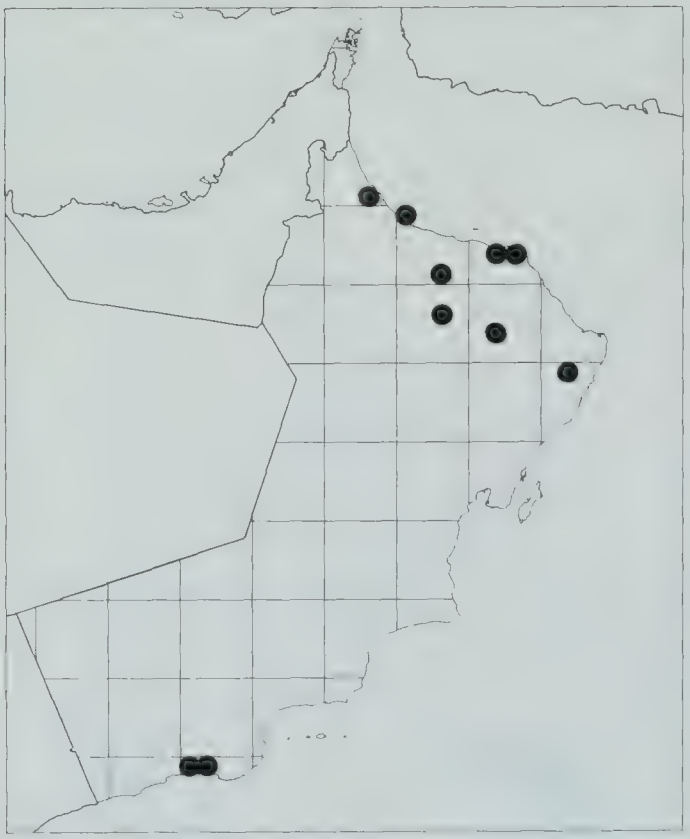


Fig. 439. Euphorbia indica.

Fig. 440. Euphorbia serpens.

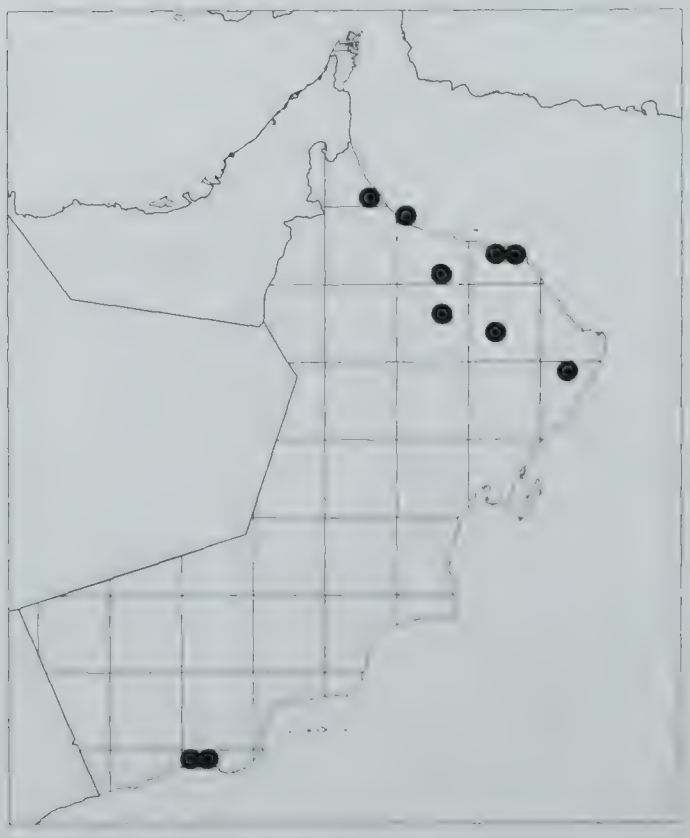


Fig. 441. Euphorbia arabica.

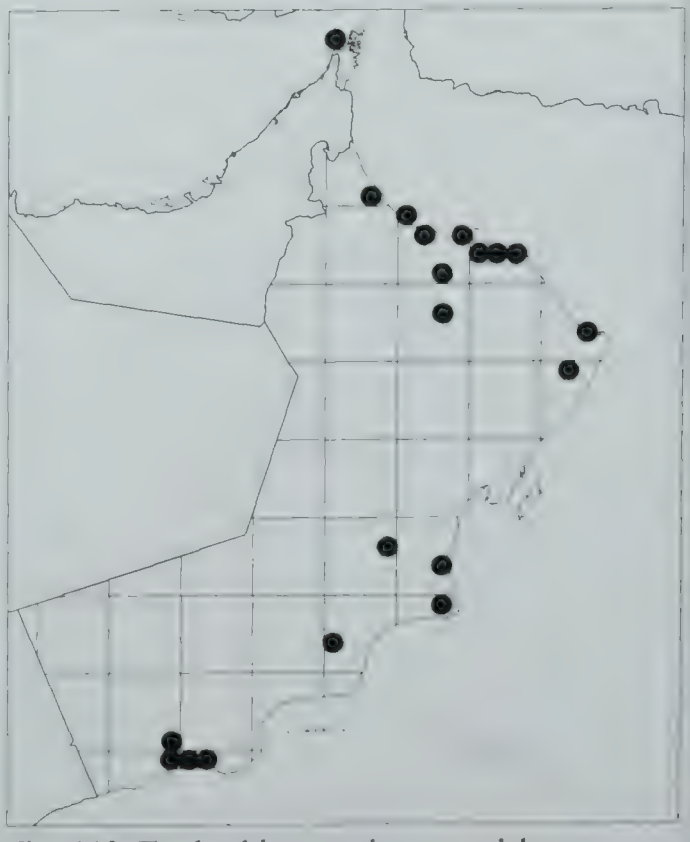


Fig. 442. Euphorbia granulata var. glabrata.

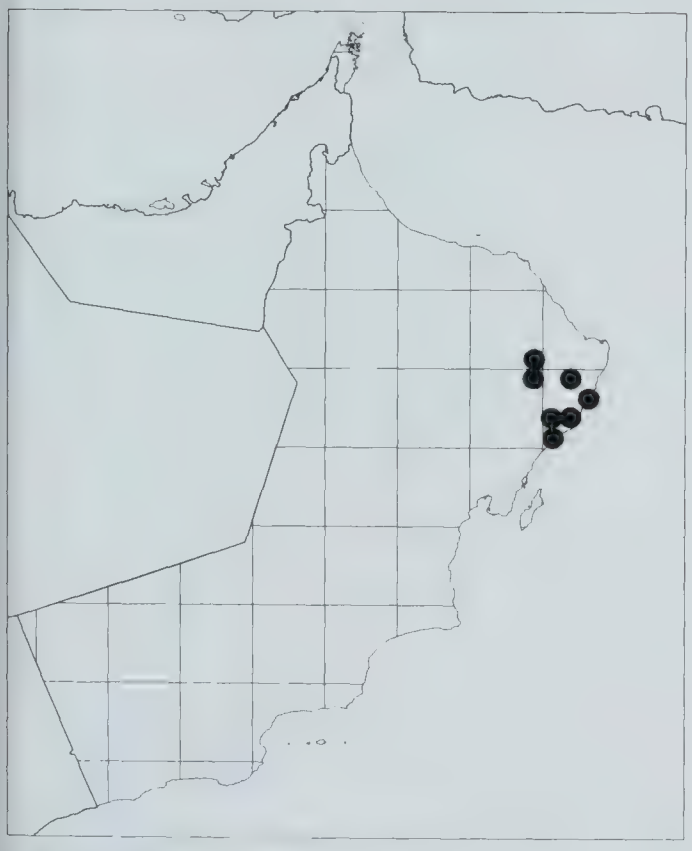


Fig. 443. Euphorbia riebeckii.

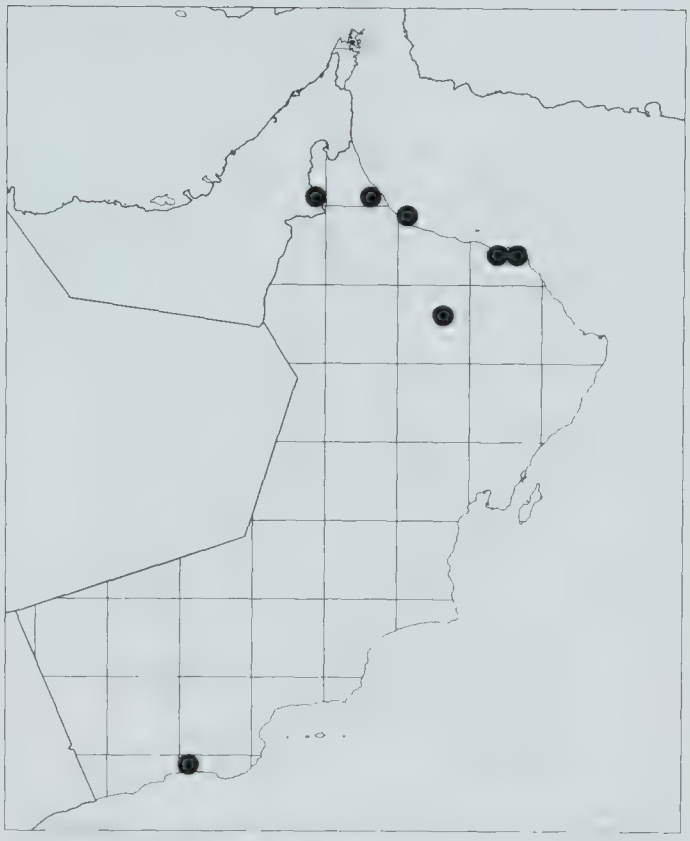


Fig. 444. Euphorbia heterophylla.

Fig. 445. Euphorbia helioscopia.

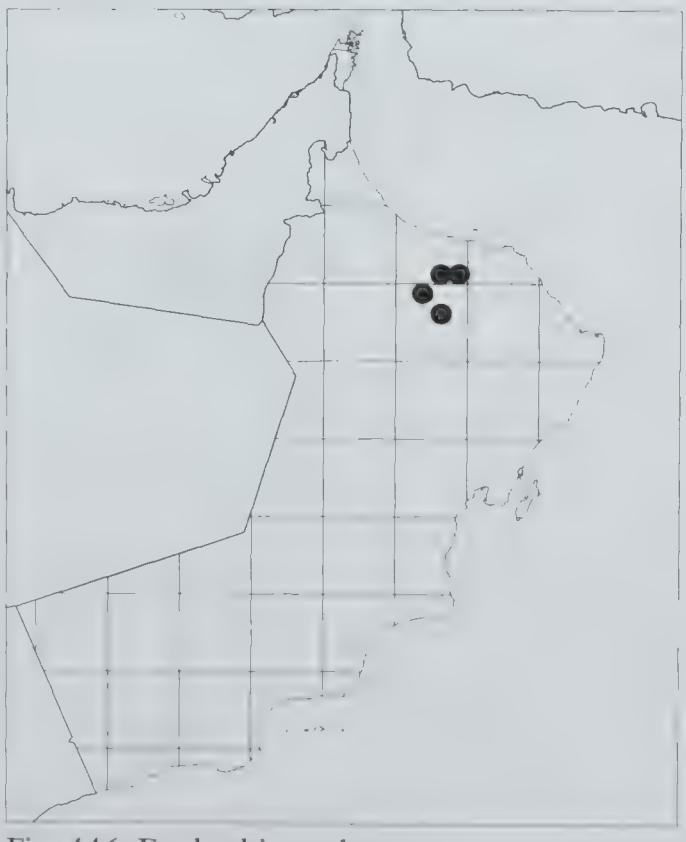


Fig. 446. Euphorbia peplus.

Fig. 447. Euphorbia dhofarensis.

Fig. 448. Euphorbia schimperi.

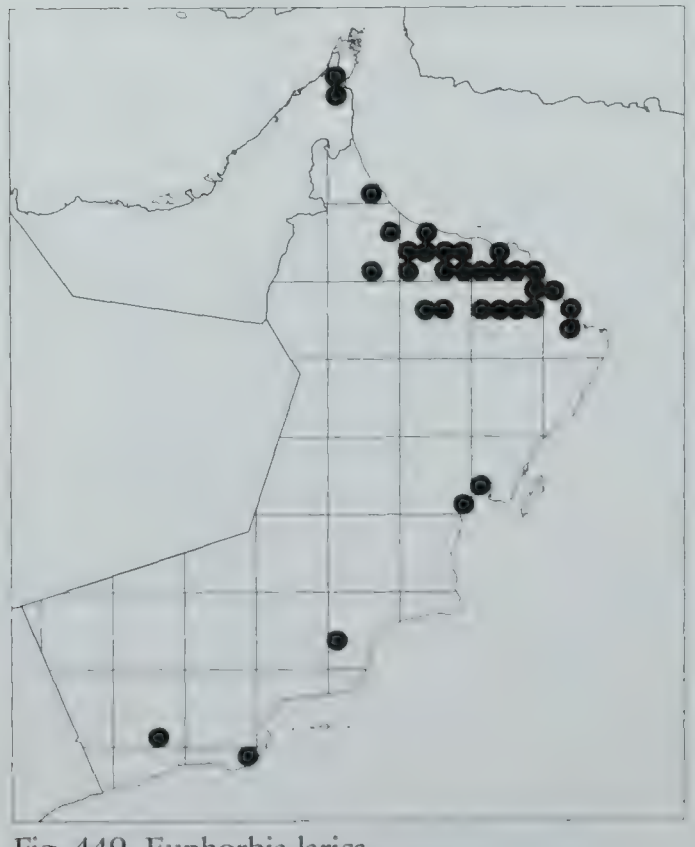


Fig. 449. Euphorbia larica.

Fig. 450. Euphorbia masirahensis.

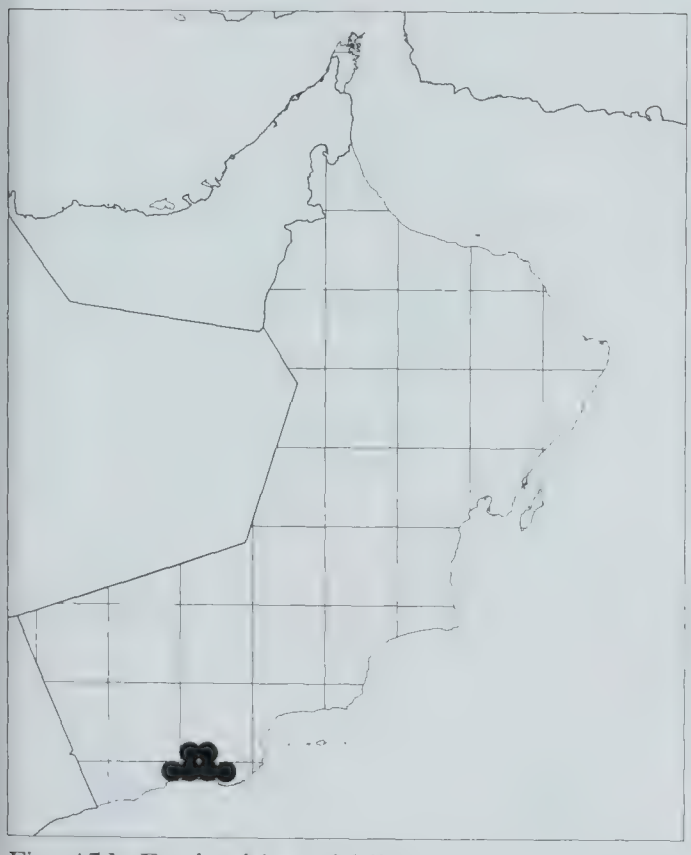


Fig. 451. Euphorbia smithii.

Fig. 452. Euphorbia cuneata.

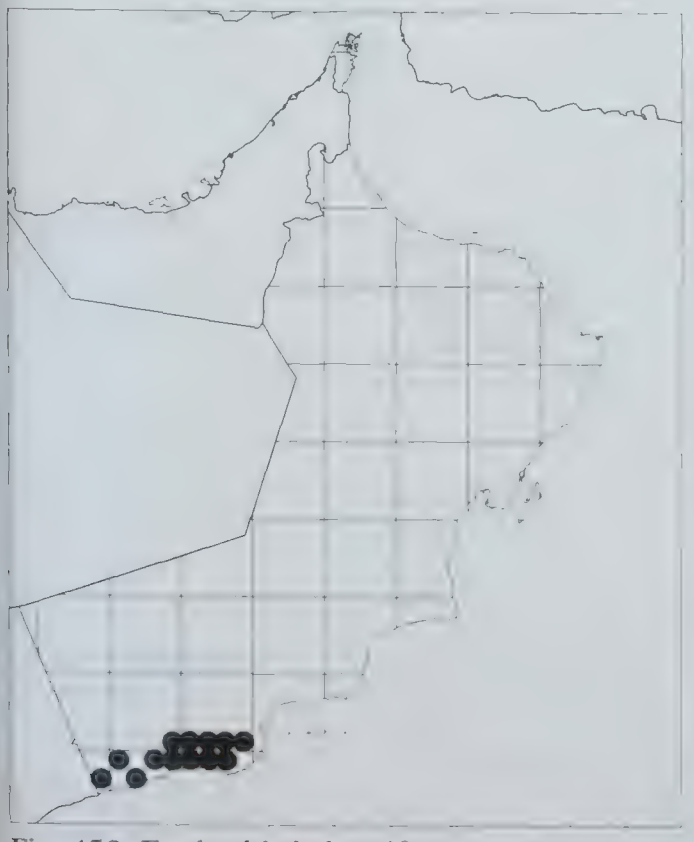


Fig. 453. Euphorbia balsamifera subsp. adenensis.

Fig. 454. Euphorbia cactus.

Fig. 455. Euphorbia hadramautica.

Fig. 456. Euphorbia pirottae.

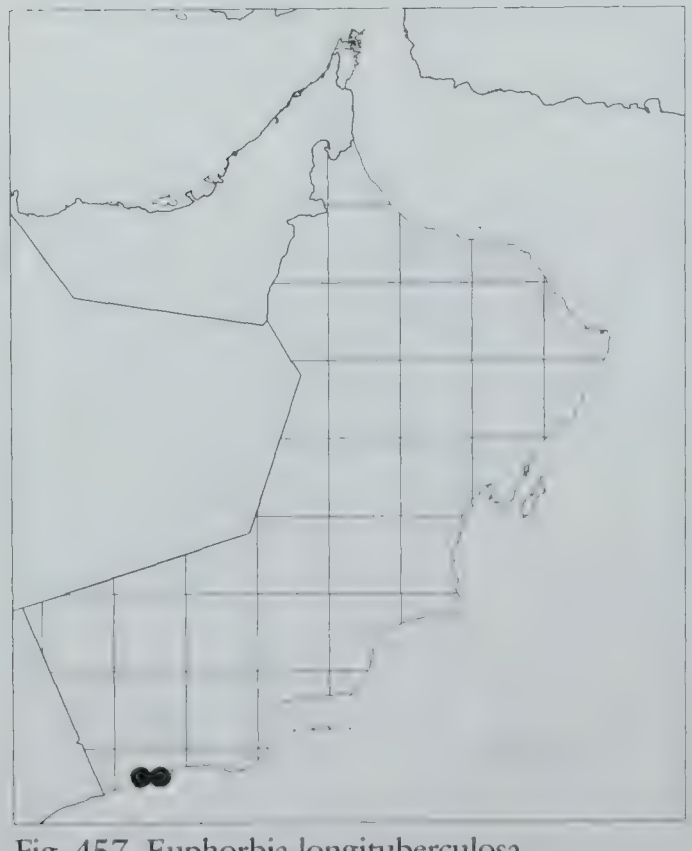


Fig. 457. Euphorbia longituberculosa.

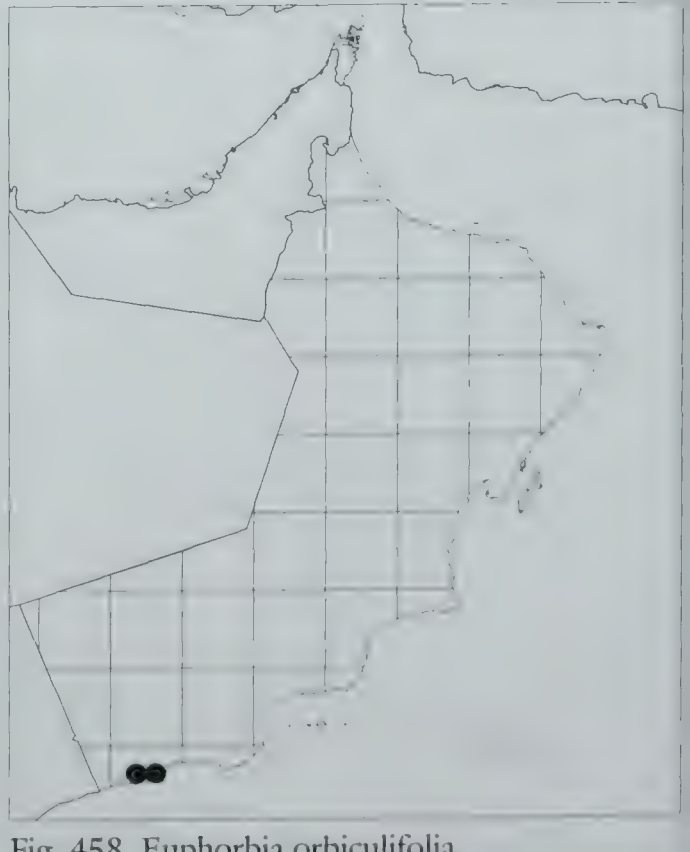


Fig. 458. Euphorbia orbiculifolia.

Fig. 459. Rhamnus staddo.

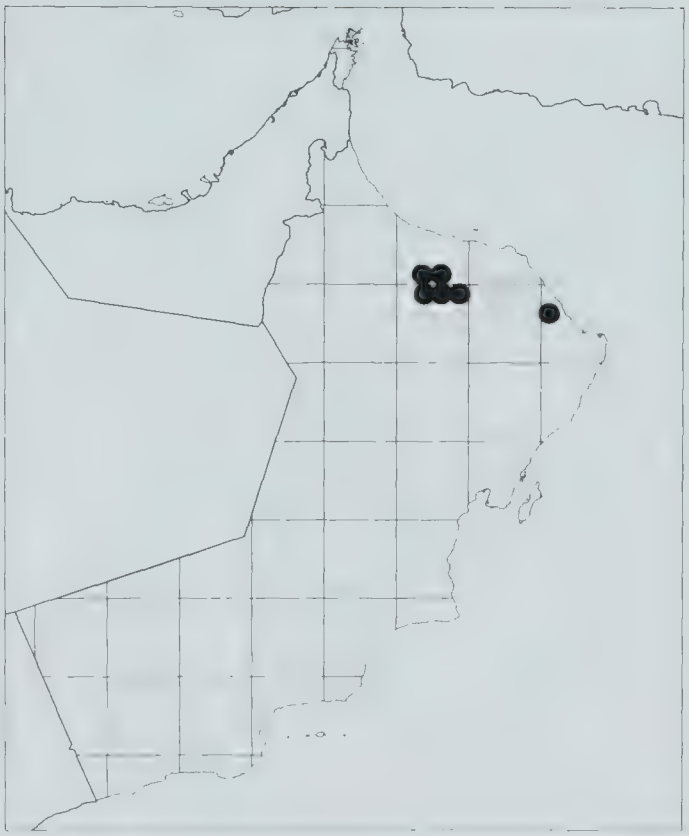


Fig. 460. Sageretia thea.

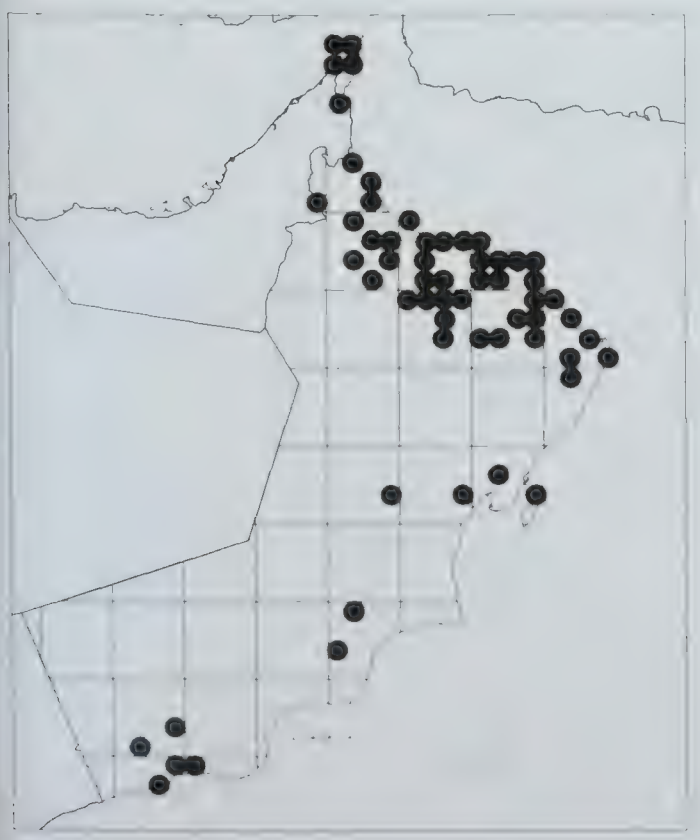


Fig. 461. Ziziphus spina-christi.

Fig. 462. Ziziphus nummularia.

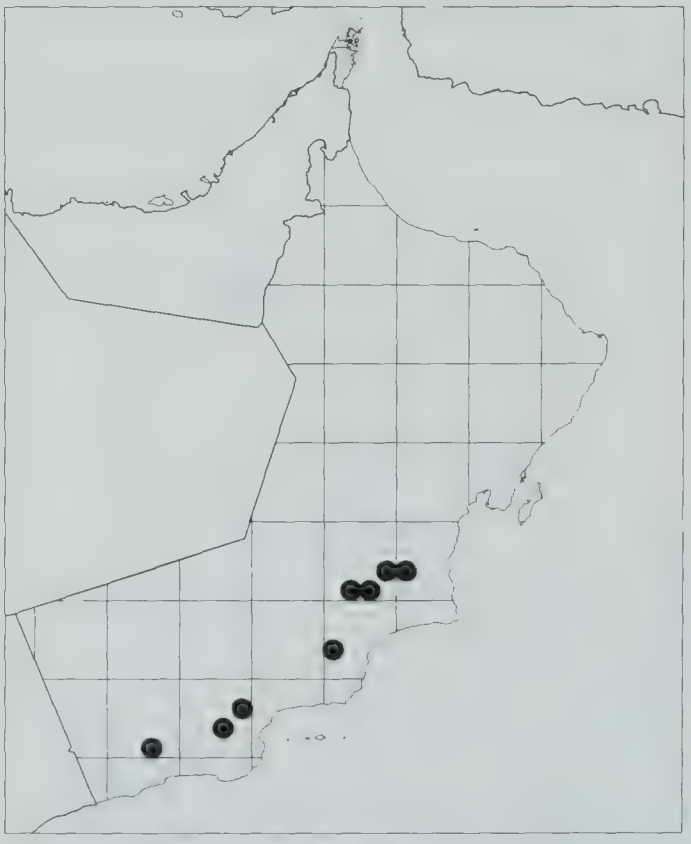


Fig. 463. Ziziphus leucodermis.

Fig. 464. Ziziphus hajarensis.

Fig. 465. Cissus quadrangularis.

Fig. 466. Cyphostemma ternatum.

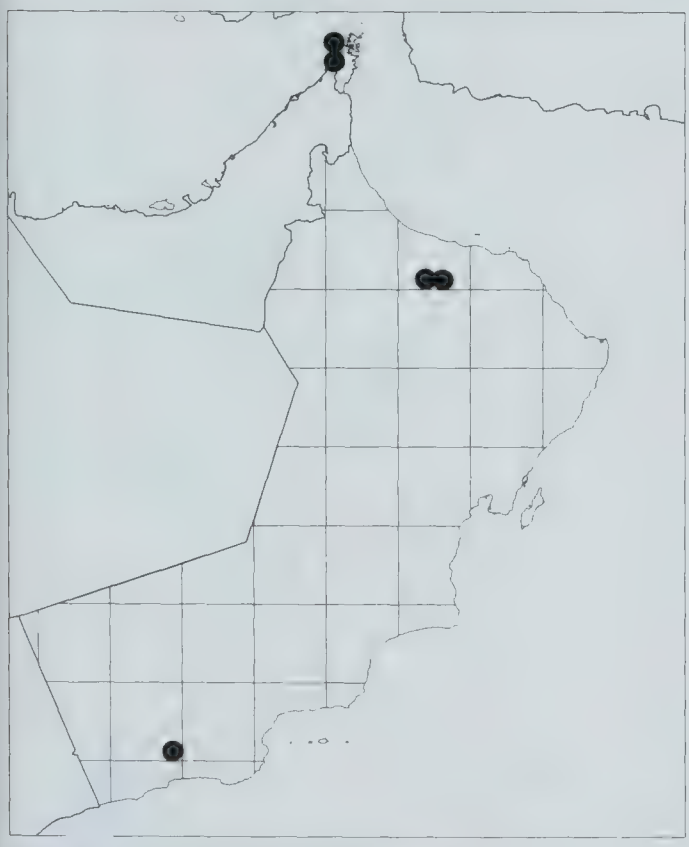


Fig. 467. Linum corymbulosum.

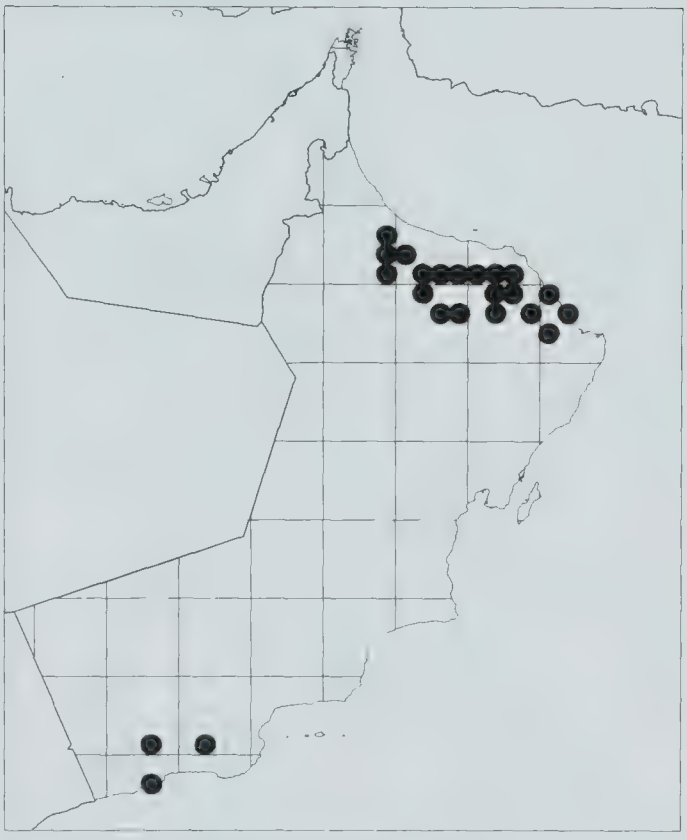


Fig. 468. Acridocarpus orientalis.

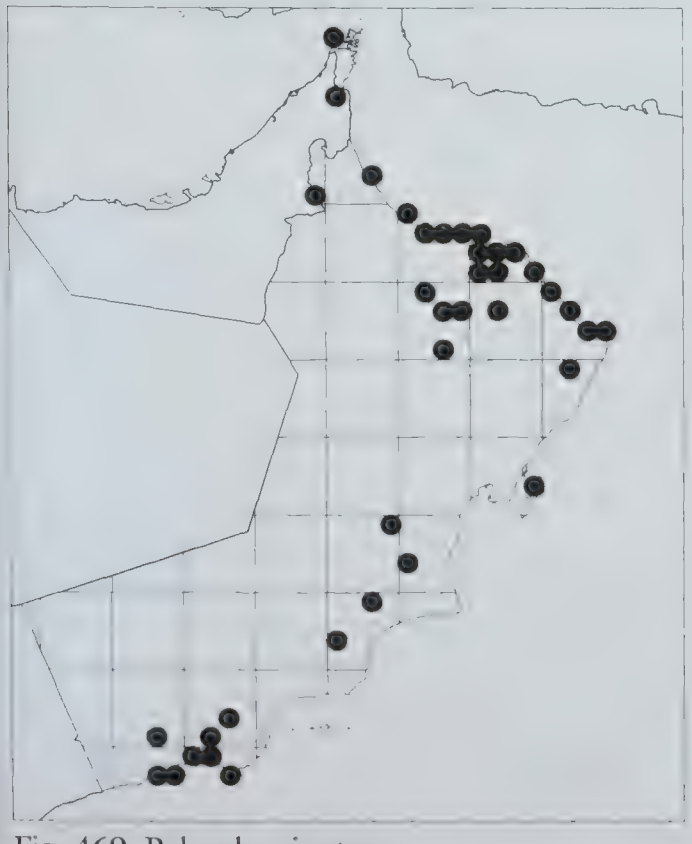


Fig. 469. Polygala erioptera.

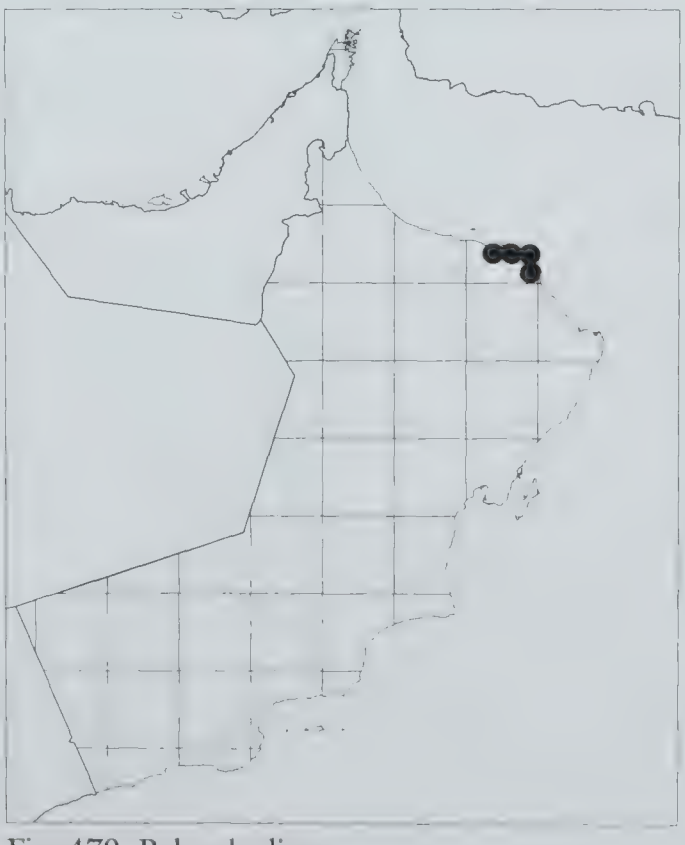


Fig. 470. Polygala dispar.

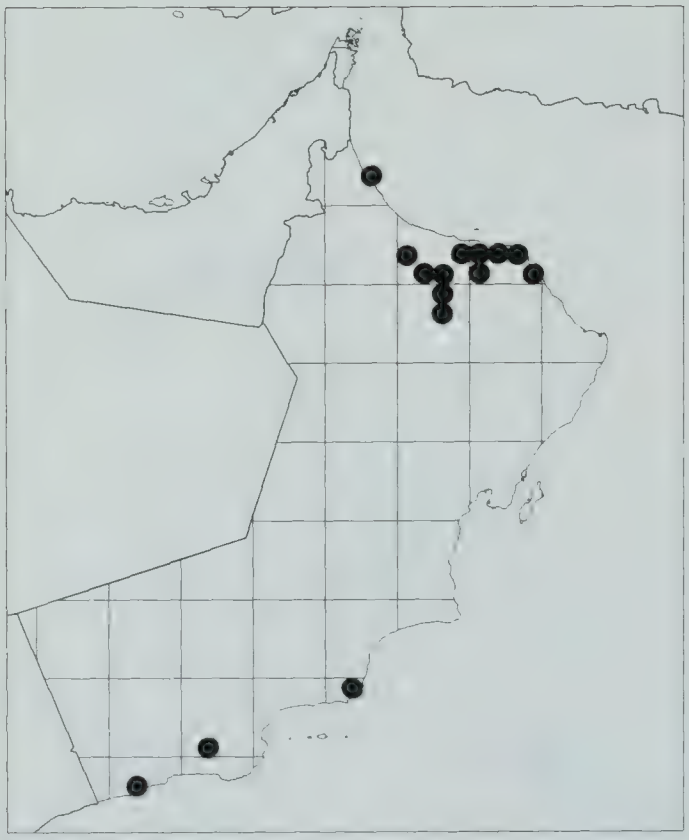


Fig. 471. Polygala irregularis.

Fig. 472. Polygala mascatensis.

Fig. 473. Polygala abyssinica.

Fig. 474. Polygala dhofarica.

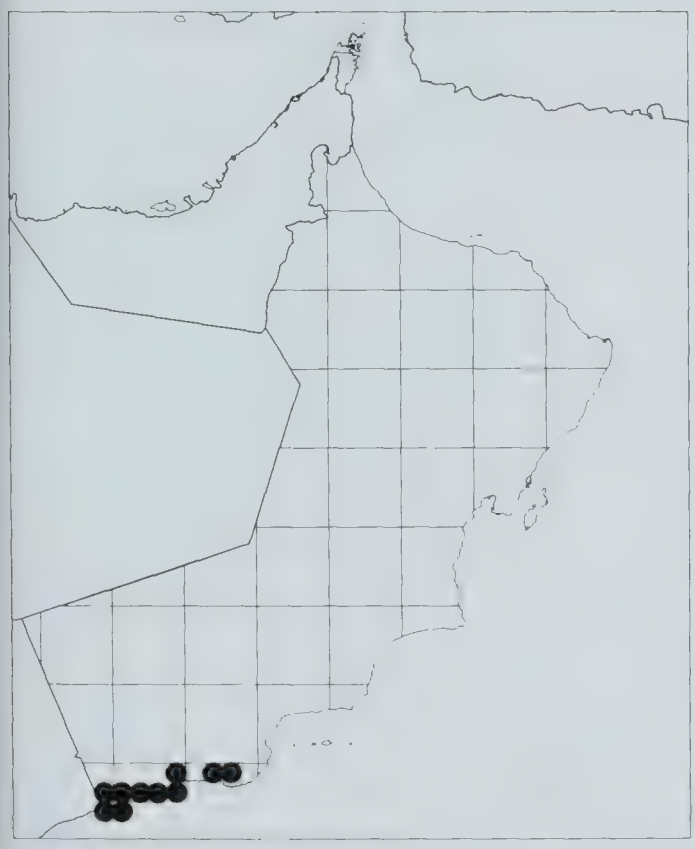


Fig. 475. Polygala senensis.

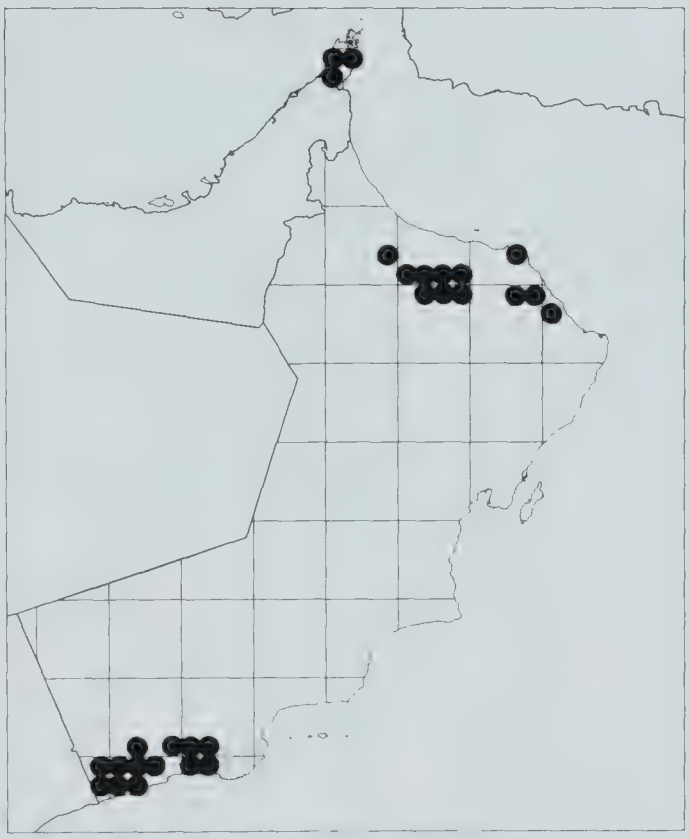


Fig. 476. Dodonaea viscosa.

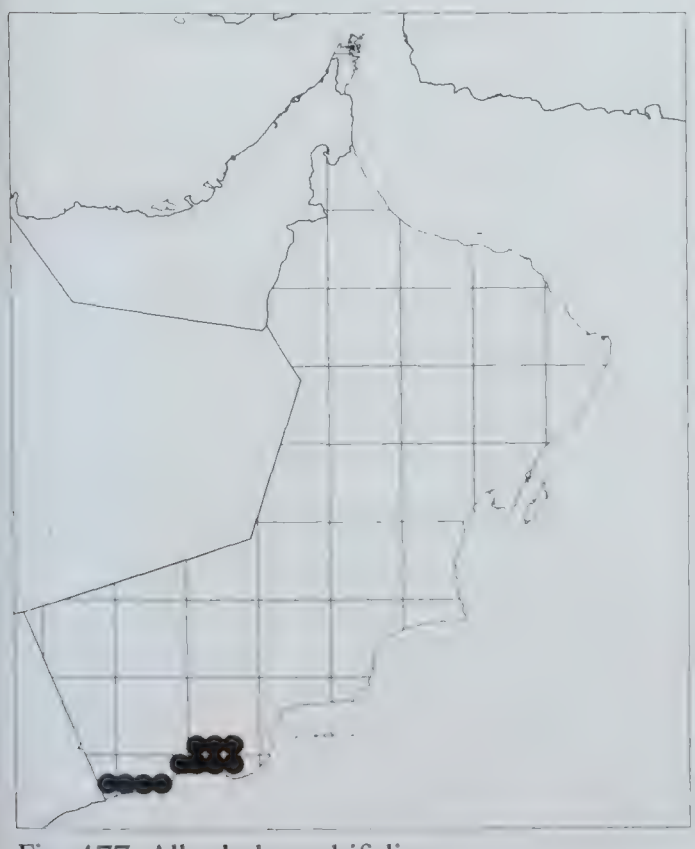


Fig. 477. Allophylus rubifolius.

Fig. 478. Pappea capensis.

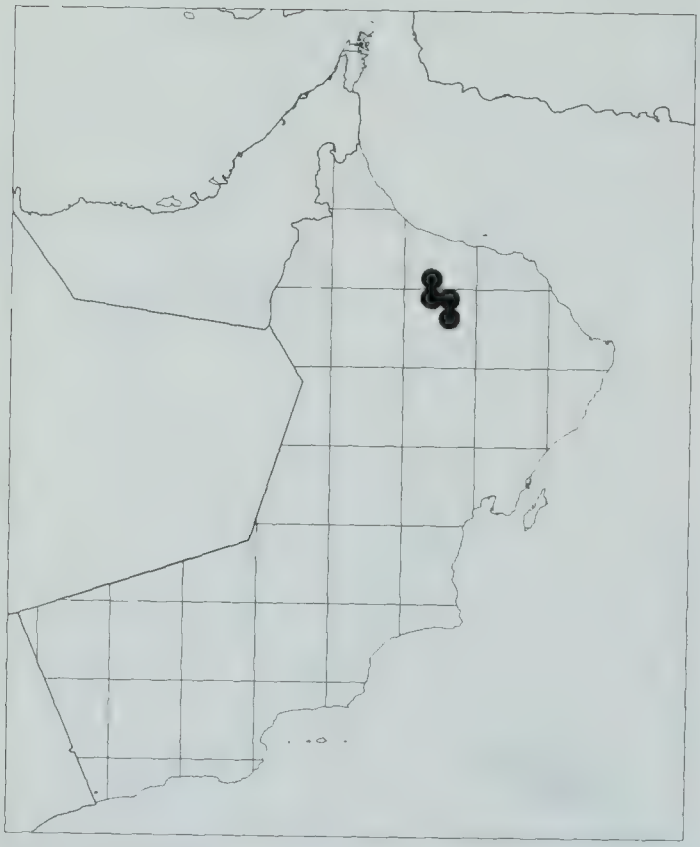


Fig. 479. Cardiospermum halicacabum.

Fig. 480. Boswellia sacra.

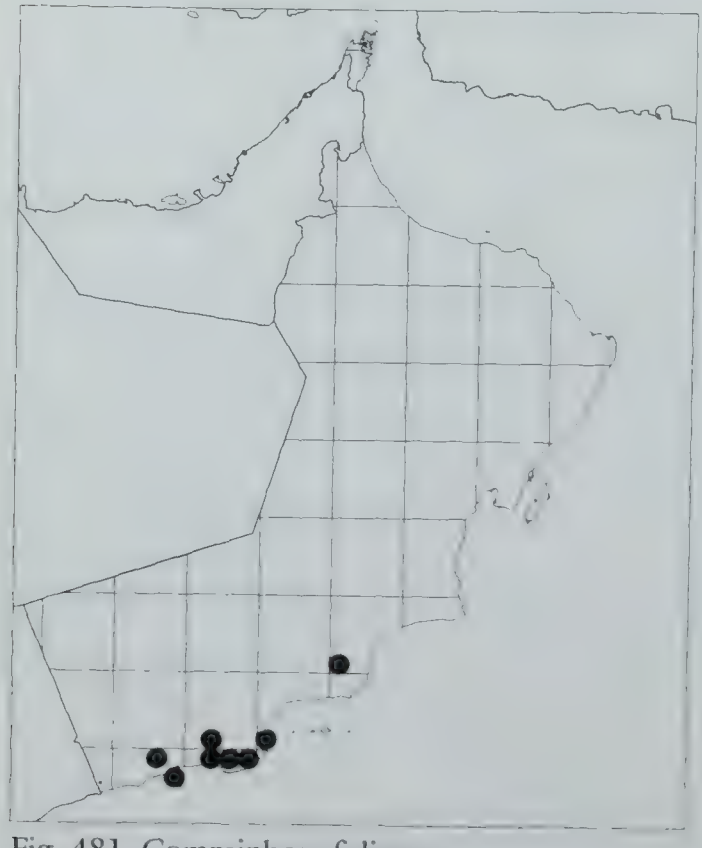


Fig. 481. Commiphora foliacea.

Fig. 482. Commiphora wightii.

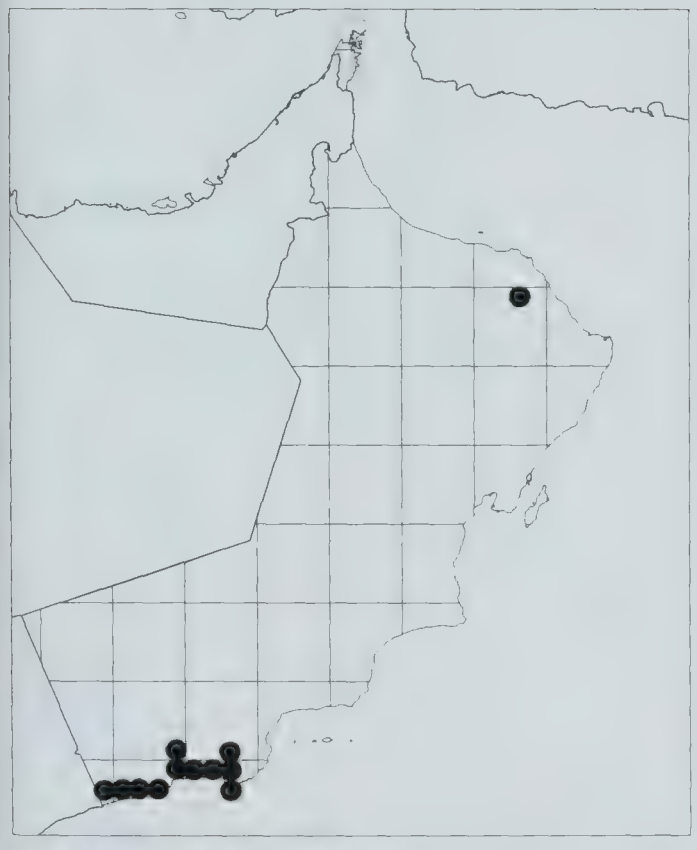


Fig. 483. Commiphora kua.

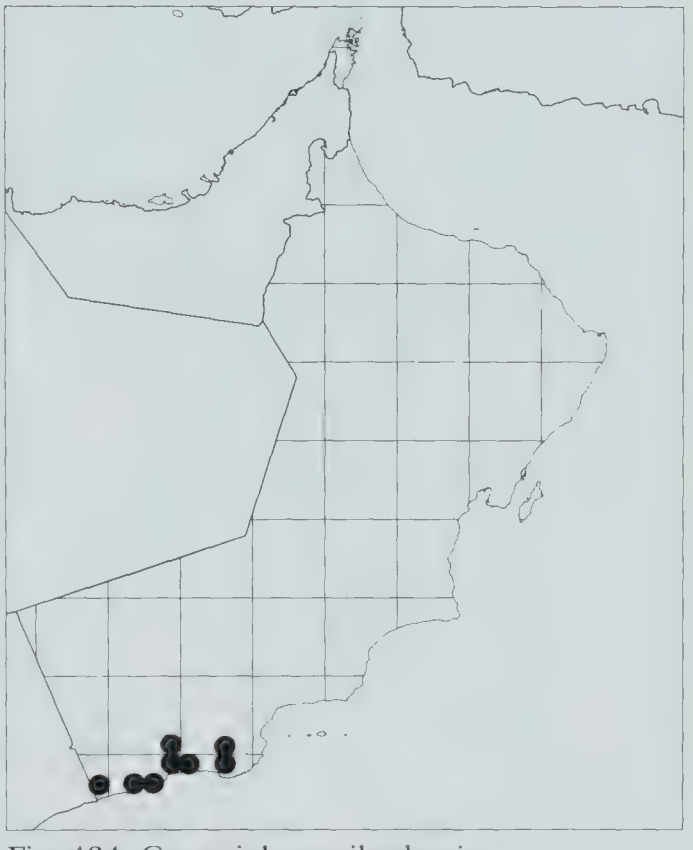


Fig. 484. Commiphora gileadensis.

Fig. 485. Rhus somalensis.

Fig. 486. Rhus retinorrhaea.

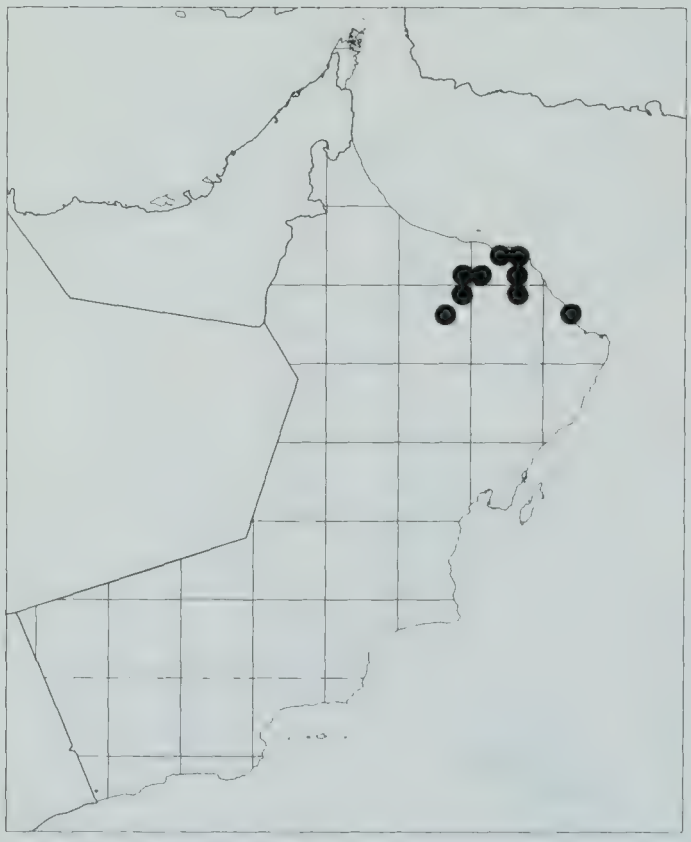


Fig. 487. Rhus aucheri.

Fig. 488. Rhus gallagheri.

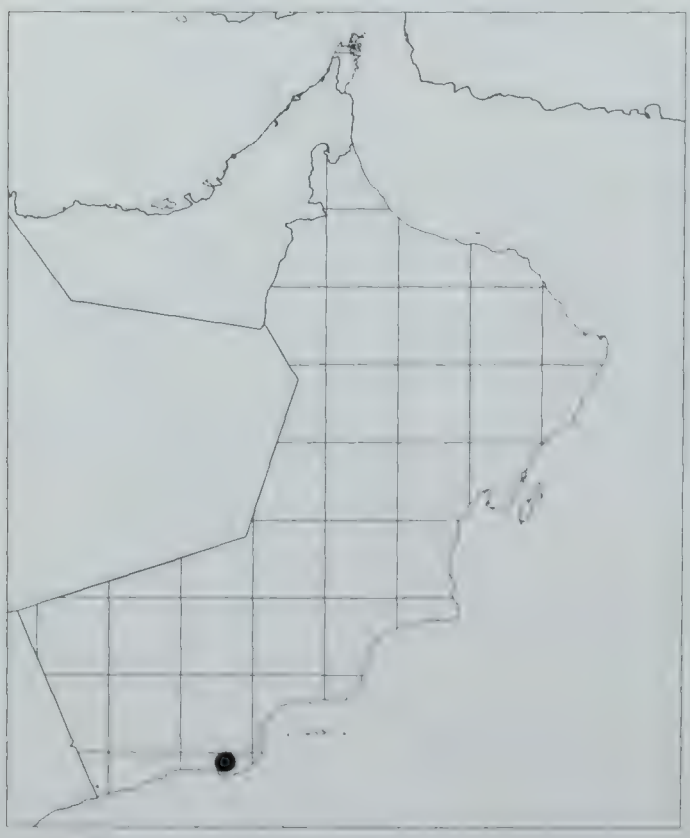


Fig. 489. Lannea malifolia.

Fig. 490. Pistacia falcata.

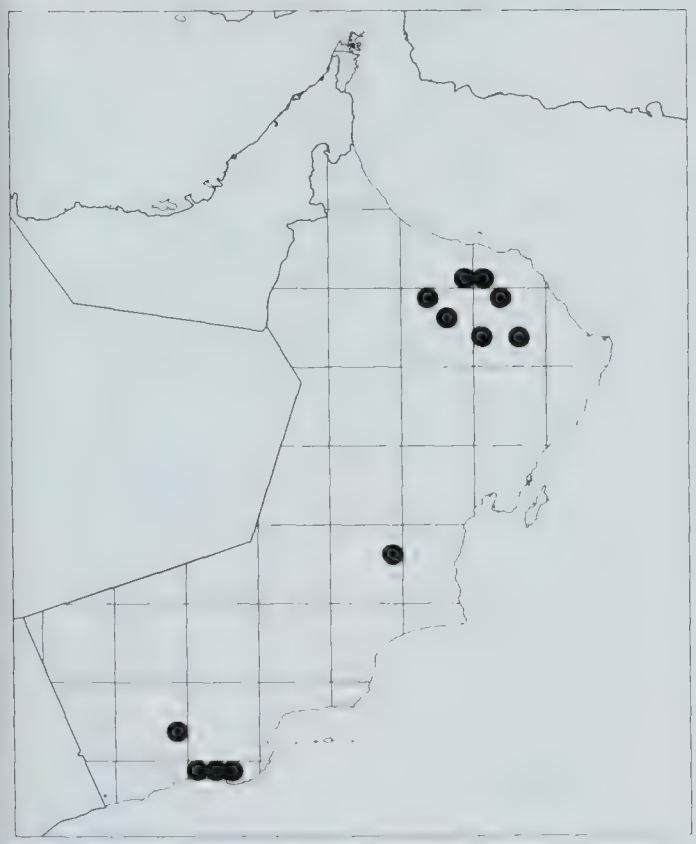


Fig. 491. Haplophyllum tuberculatum.

Fig. 492. Ruta chalepensis.

Fig. 493. Thamnosma hirschii.

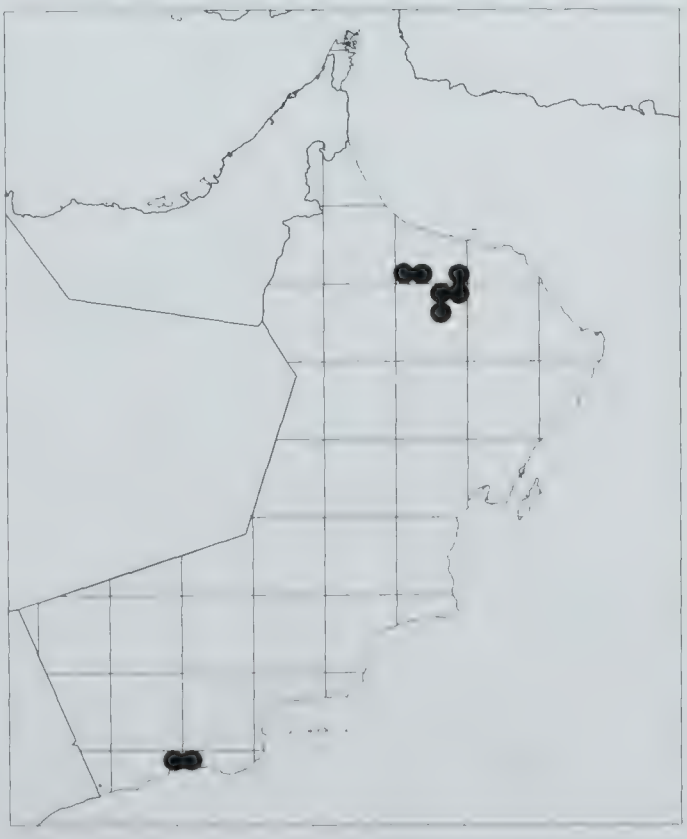


Fig. 494. Oxalis corniculata.

Fig. 495. Balanites aegyptiaca.

Fig. 496. Tribulus terrestris.

Fig. 497. Tribulus bimucronatus.

Fig. 498. Tribulus pentandrus.

Fig. 499. Tribulus arabicus.

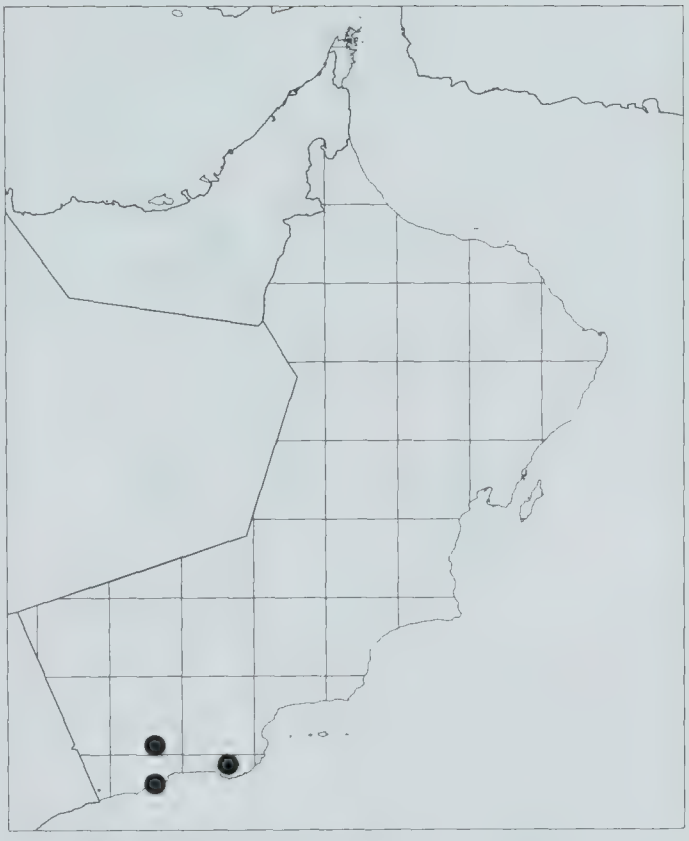


Fig. 500. Kelleronia gillettae.

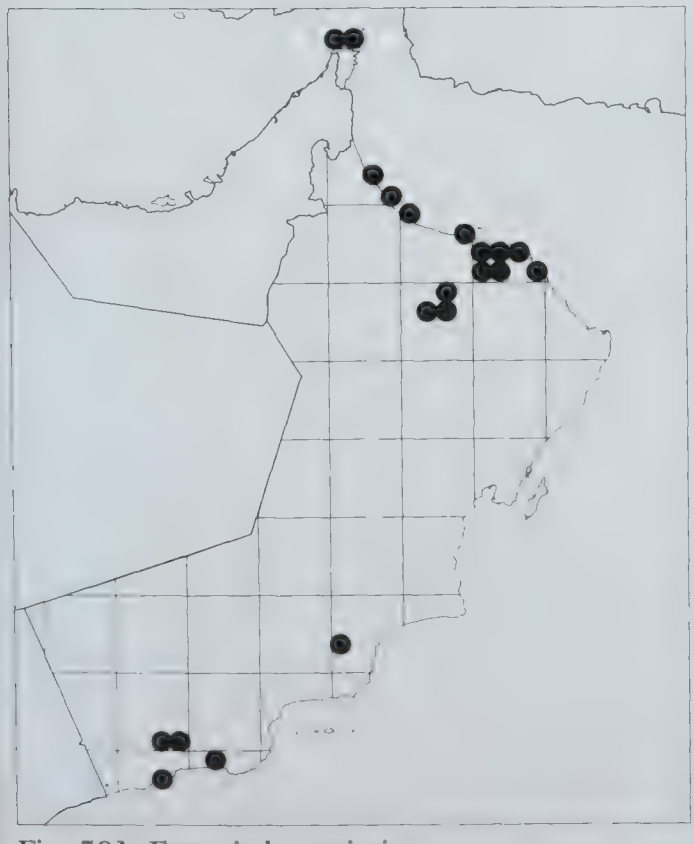


Fig. 501. Fagonia bruguieri.

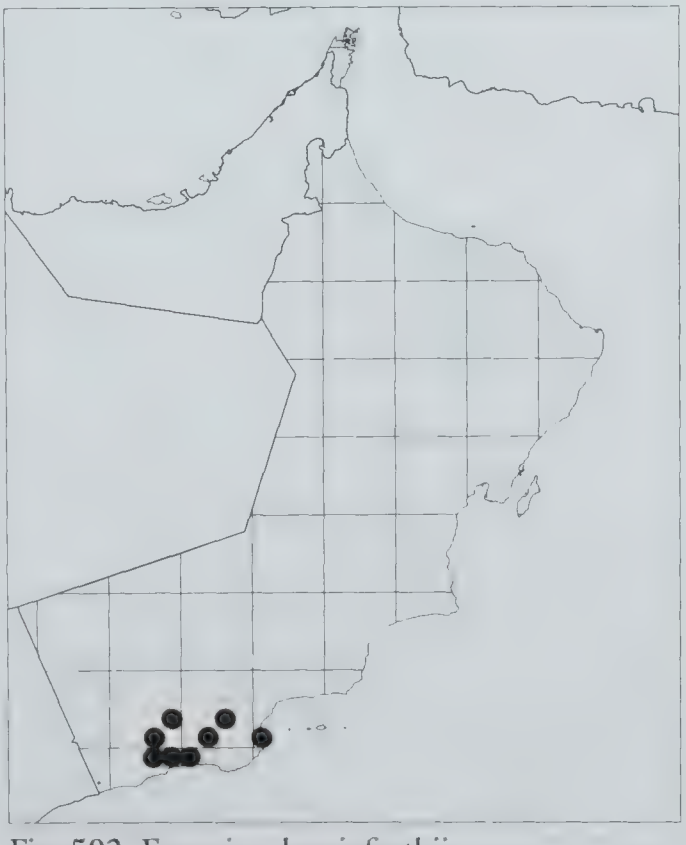


Fig. 502. Fagonia schweinfurthii.

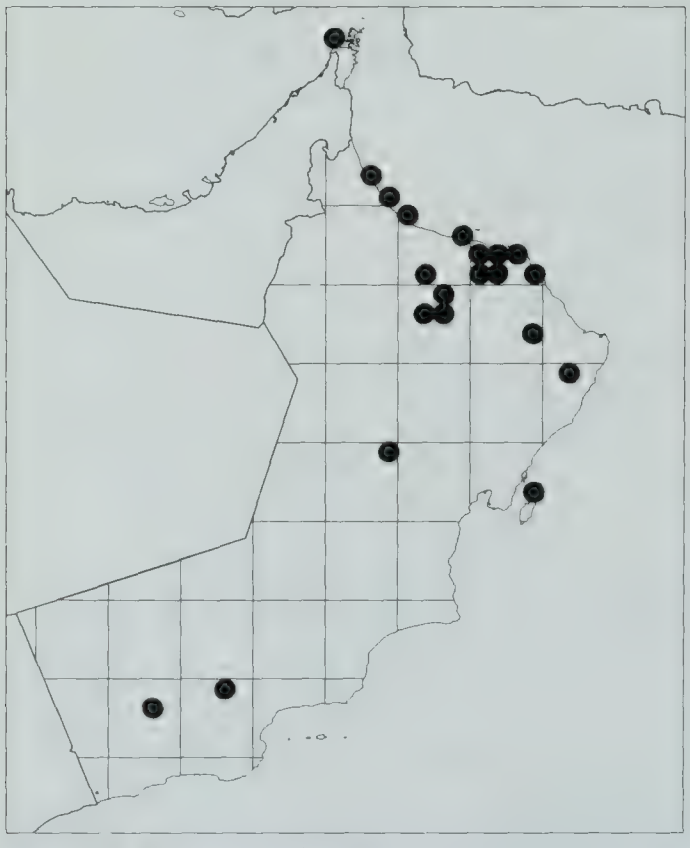


Fig. 503. Fagonia indica.

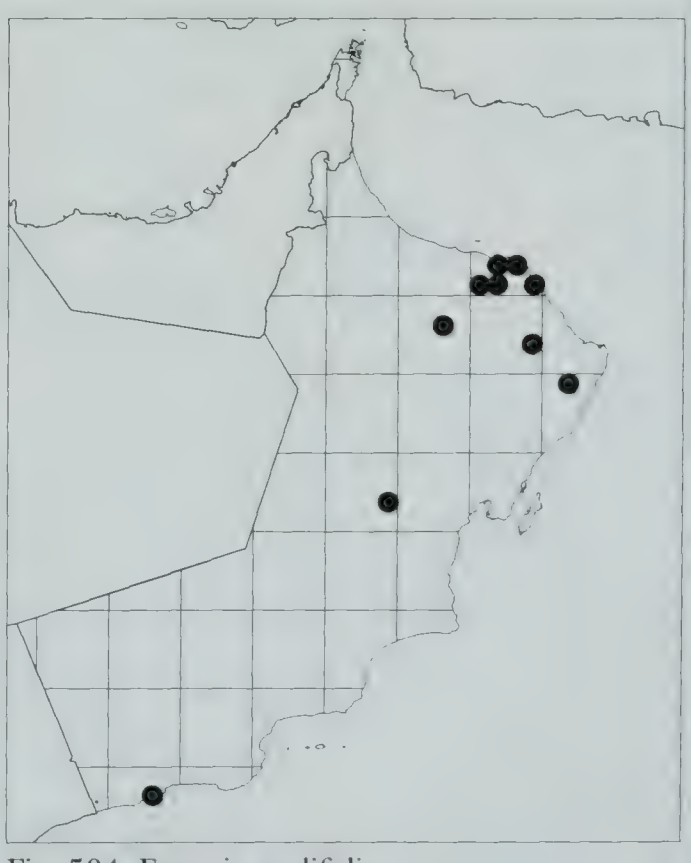


Fig. 504. Fagonia ovalifolia.

Fig. 505. Fagonia luntii.

Fig. 506. Fagonia mahrana.

Fig. 507. Melocarpum robechii.

Fig. 508. Tetraena alba.

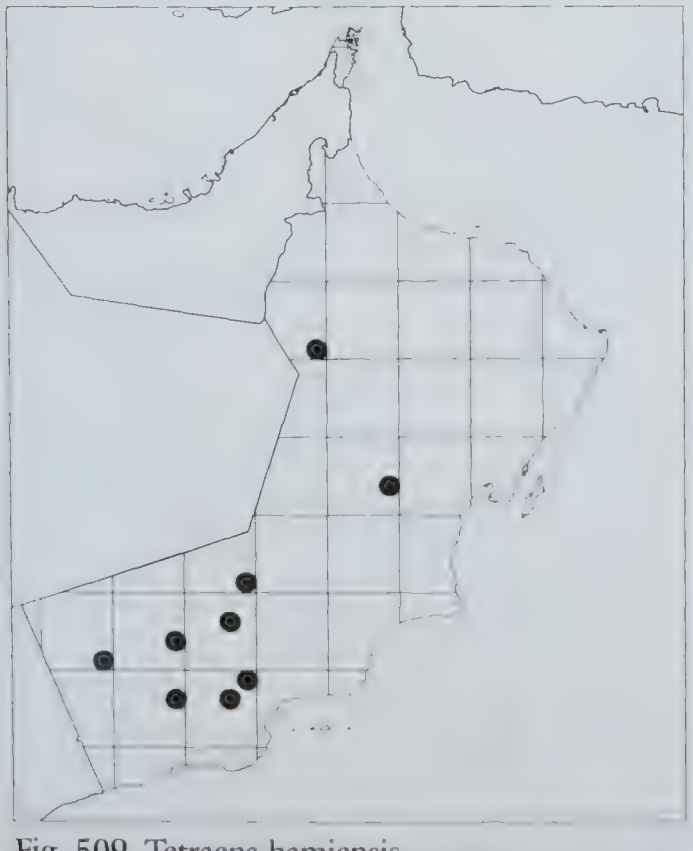


Fig. 509. Tetraena hamiensis.

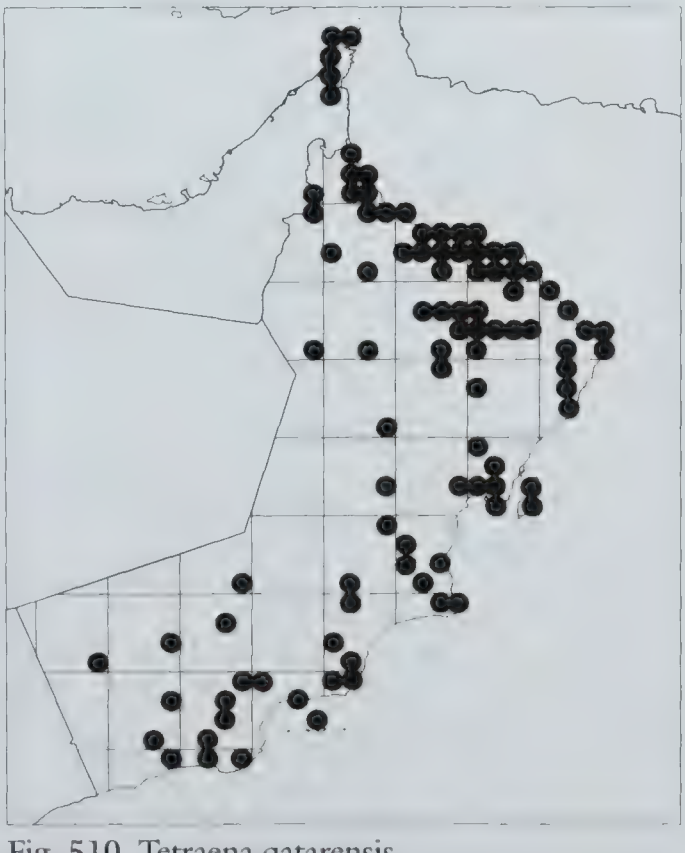


Fig. 510. Tetraena qatarensis.

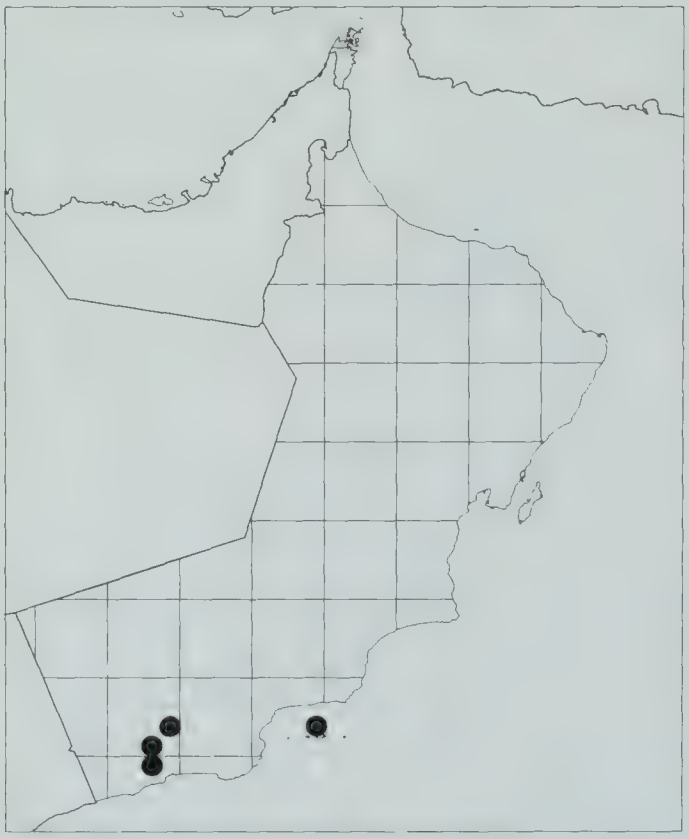


Fig. 511. Tetraena decumbens.

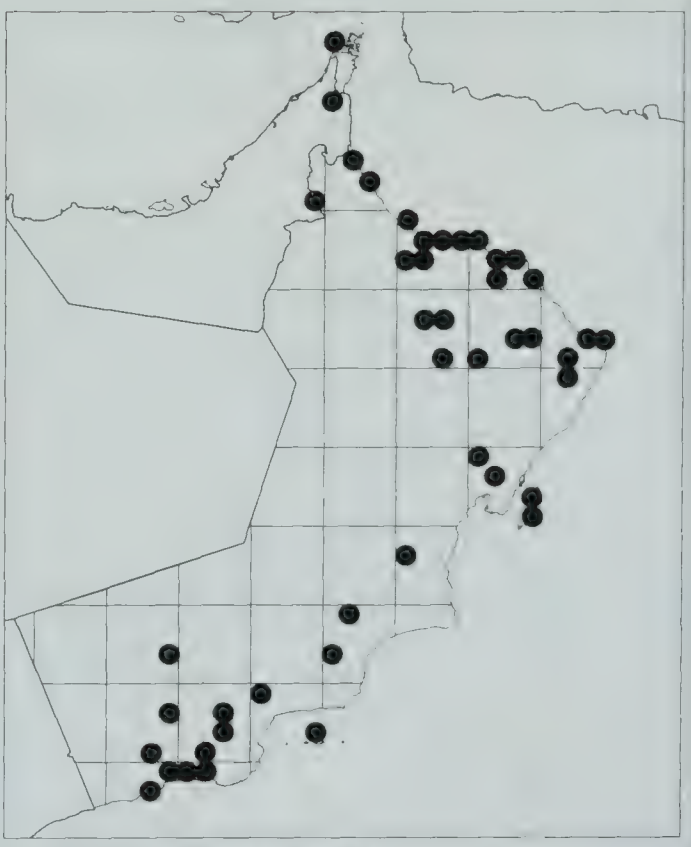


Fig. 512. Tetraena simplex.

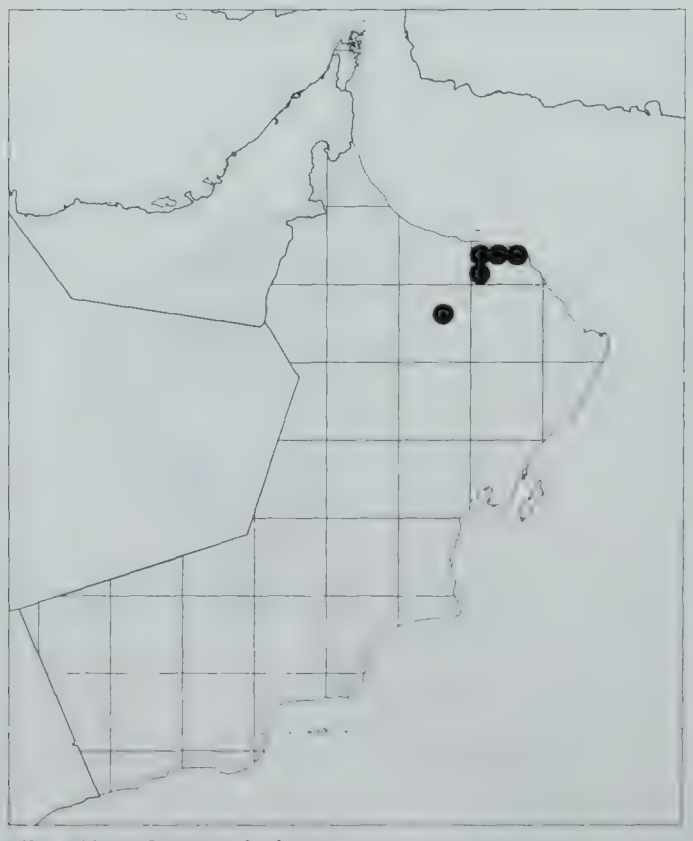


Fig. 513. Seetzenia lanata.

Fig. 514. Geranium mascatense.

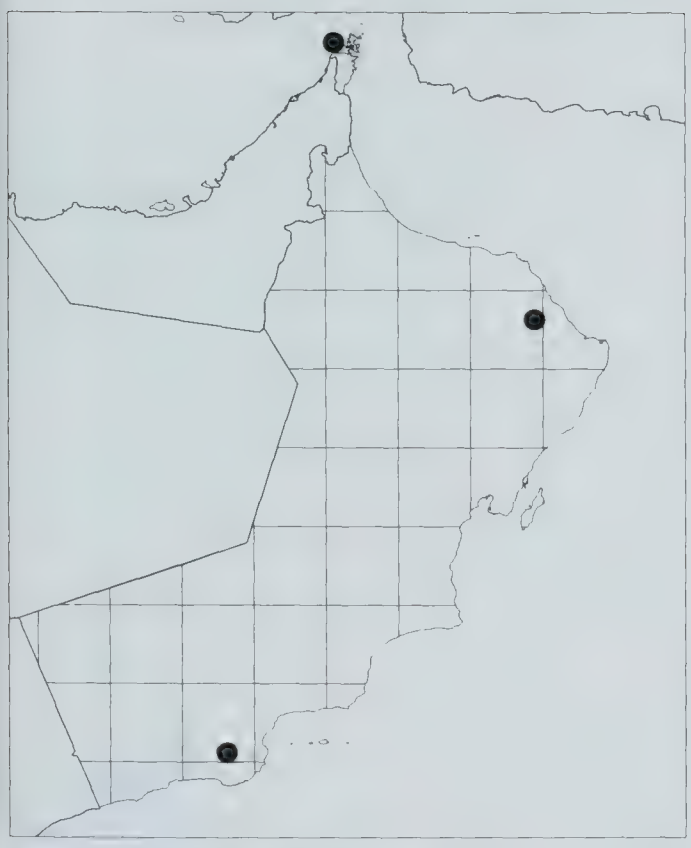


Fig. 515. Geranium trilophum.

Fig. 516. Geranium biuncinatum.

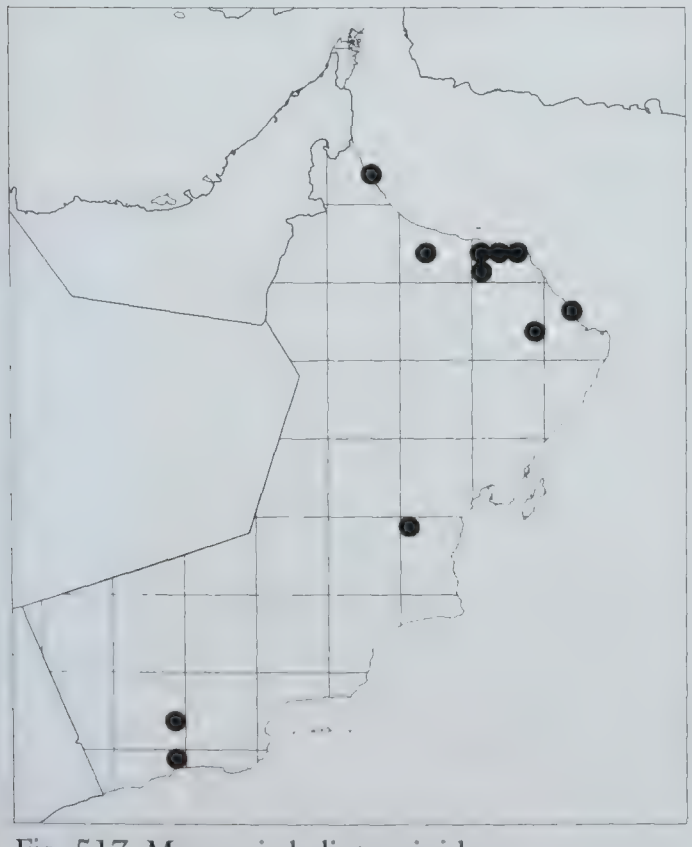


Fig. 517. Monsonia heliotropioides.

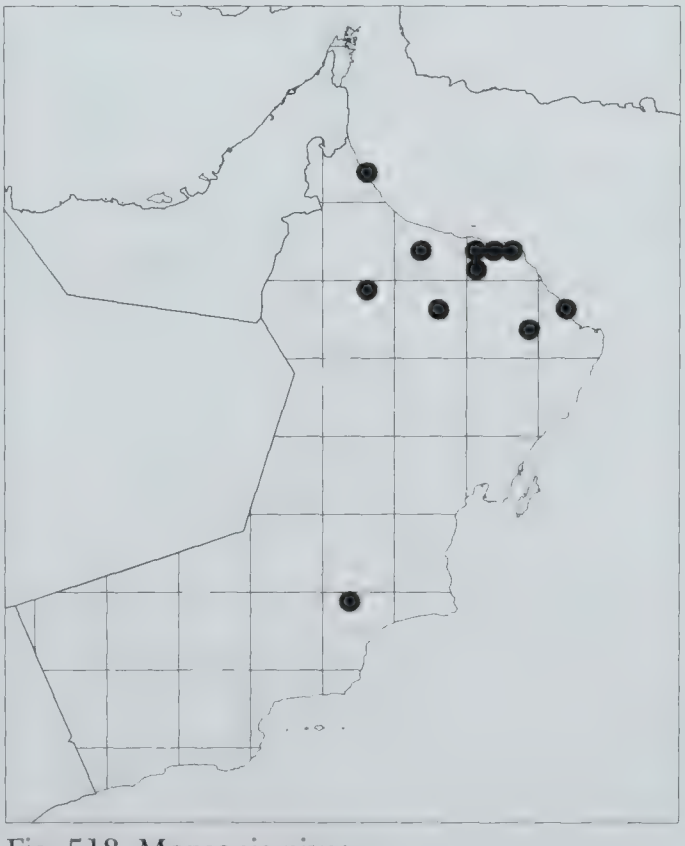


Fig. 518. Monsonia nivea.

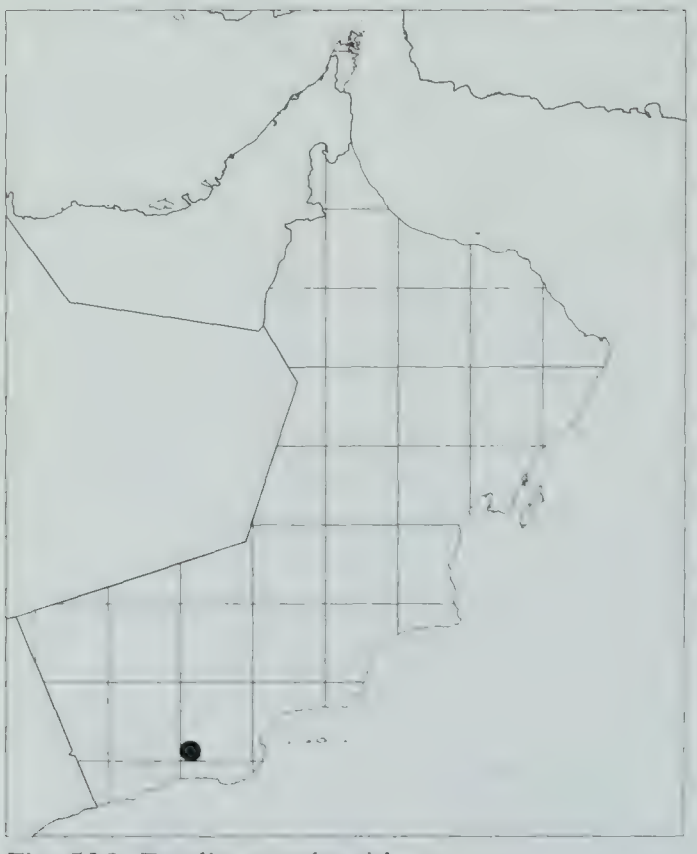


Fig. 519. Erodium malacoides.

Fig. 520. Erodium neuradifolium.

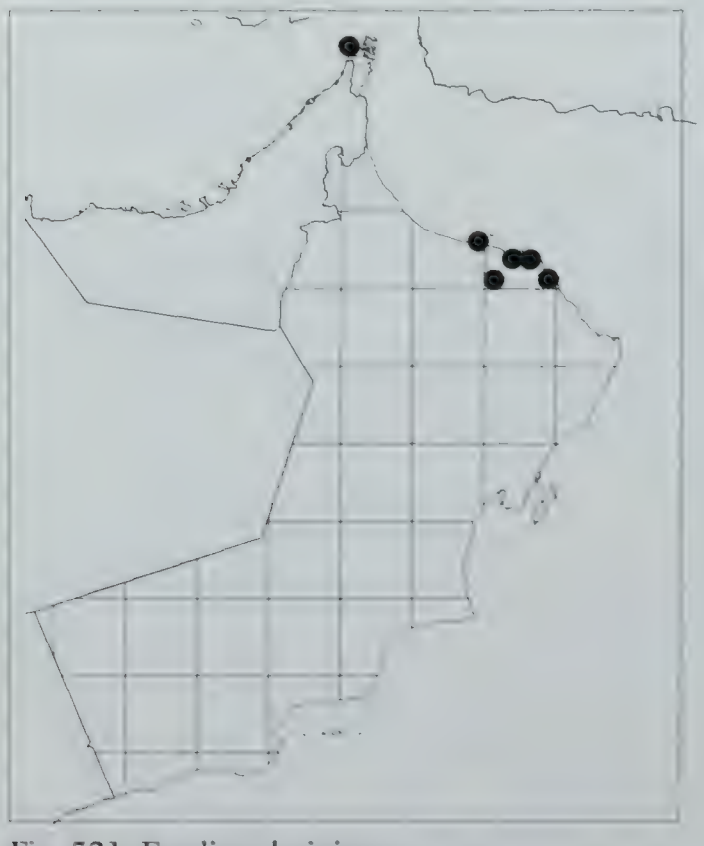


Fig. 521. Erodium laciniatum.

Fig. 522. Erodium cicutarium.

Fig. 523. Impatiens balsamina.

Fig. 524. Pycnocycla prostrata.

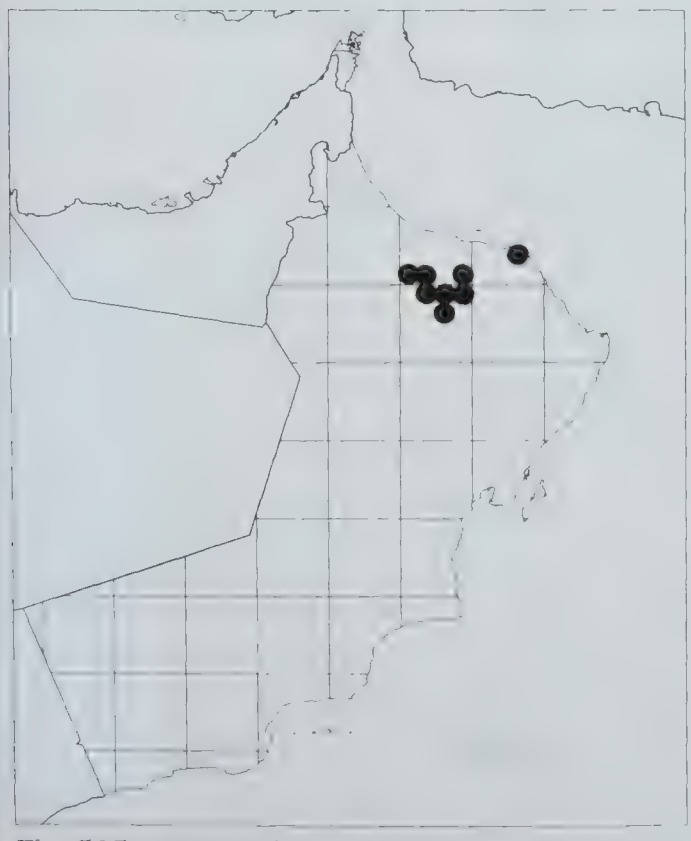


Fig. 525. Pycnocycla aucheriana.

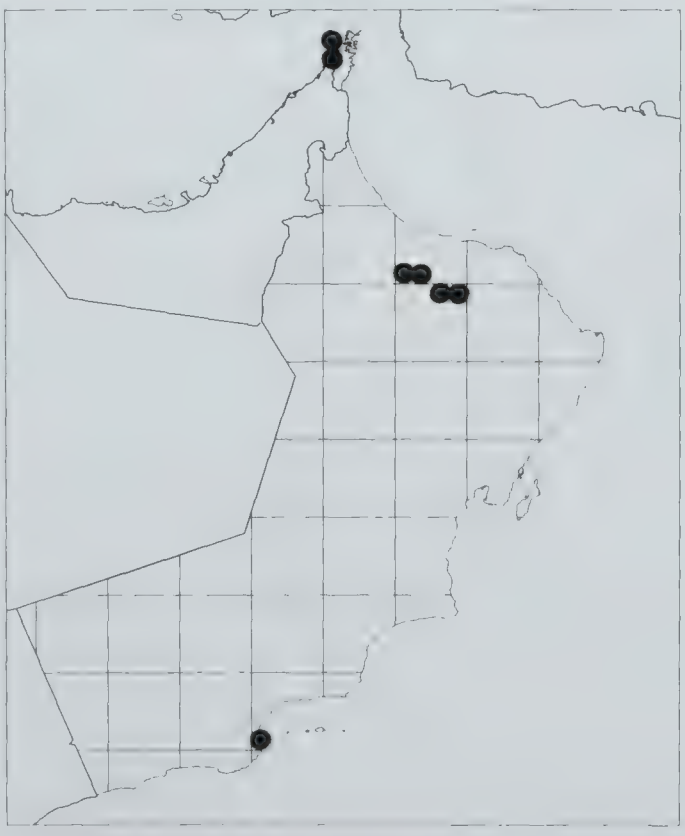


Fig. 526. Pycnocycla caespitosa.

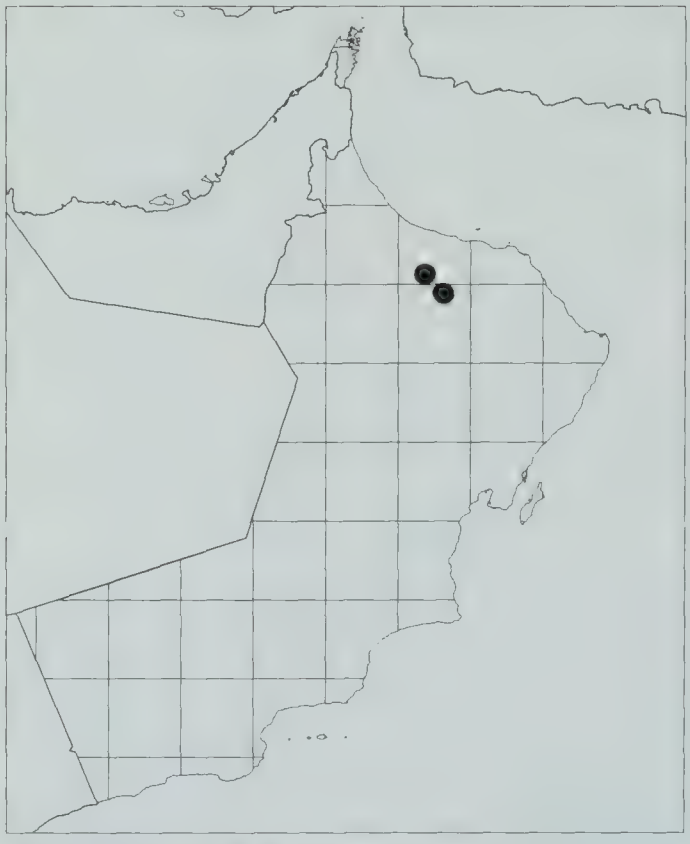


Fig. 527. Scandix pecten-veneris.

Fig. 528. Torilis stocksiana.

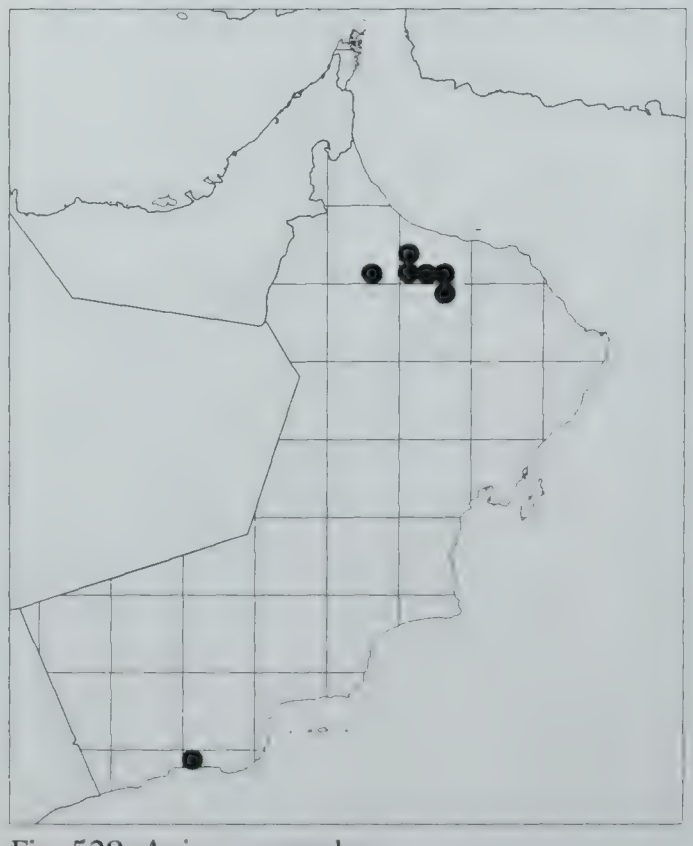


Fig. 529. Apium graveolens.

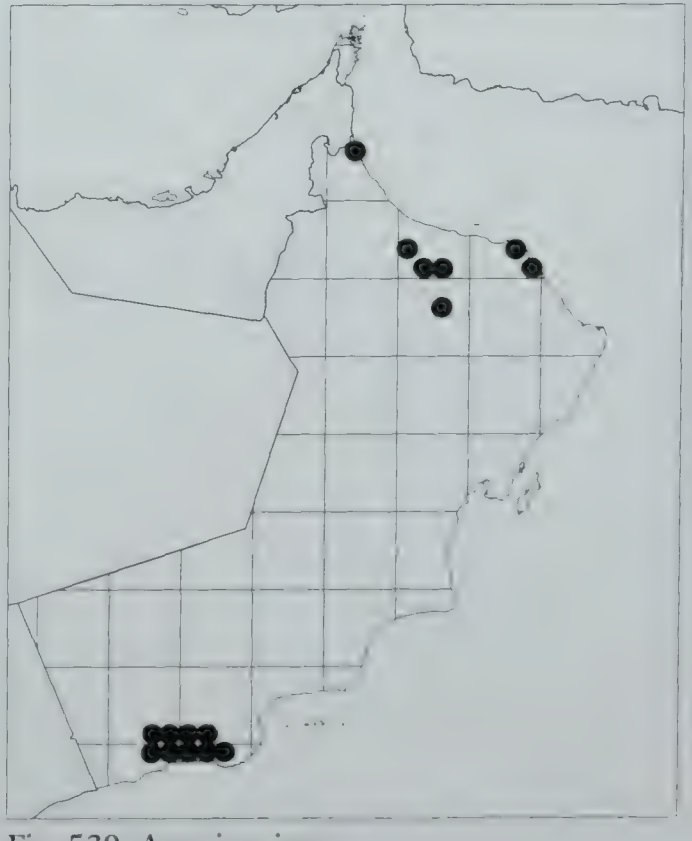
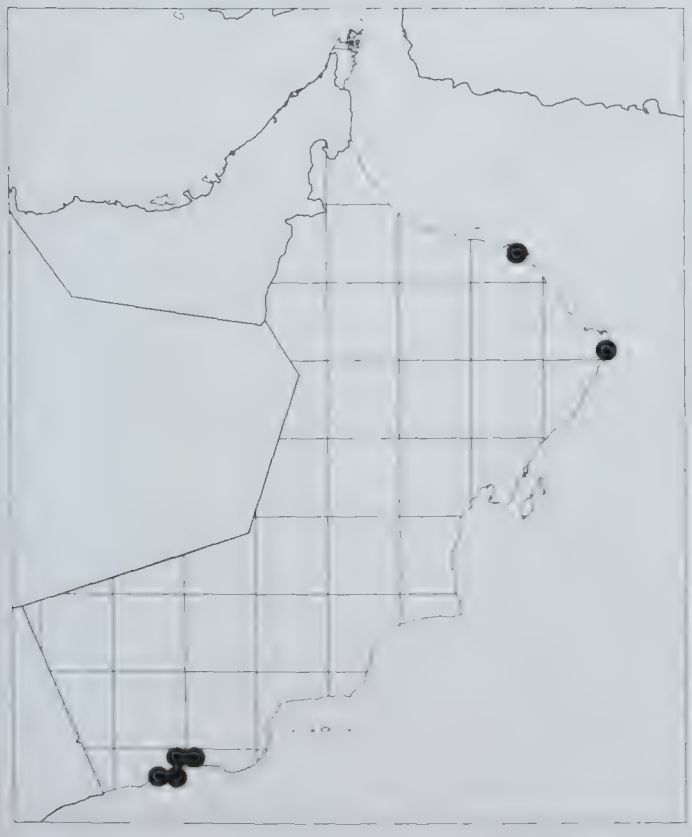


Fig. 530. Ammi majus.

Fig. 531. Pimpinella etbaica.

Fig. 532. Pimpinella schweinfurthii.



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Interactive CD-ROM with colour photographs
and Index of vernacular names

Map of the main locations of the Sultanate of Oman

Scripta Botanica Belgica 36

S.A. Ghazanfar

FLORA OF THE SULTANATE OF OMAN
Volume 2
Crassulaceae – Apiaceae

The second volume of the *Flora of the Sultanate of Oman* describes 277 taxa in 33 families of flowering plants. In the treatment of each family, keys are provided to genera as well as to all species within a genus. Species descriptions are concise and include notes on distribution, habitat, flowering and fruiting times, conservation status, and uses. Relevant synonyms, and vernacular names, where known, are given. Distribution maps are provided for all described species. The accompanying CD-ROM includes photographs of most of the species in this and volume 1. A list of vernacular names is also added to aid in the identification of plants.

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